The Buffalo Book

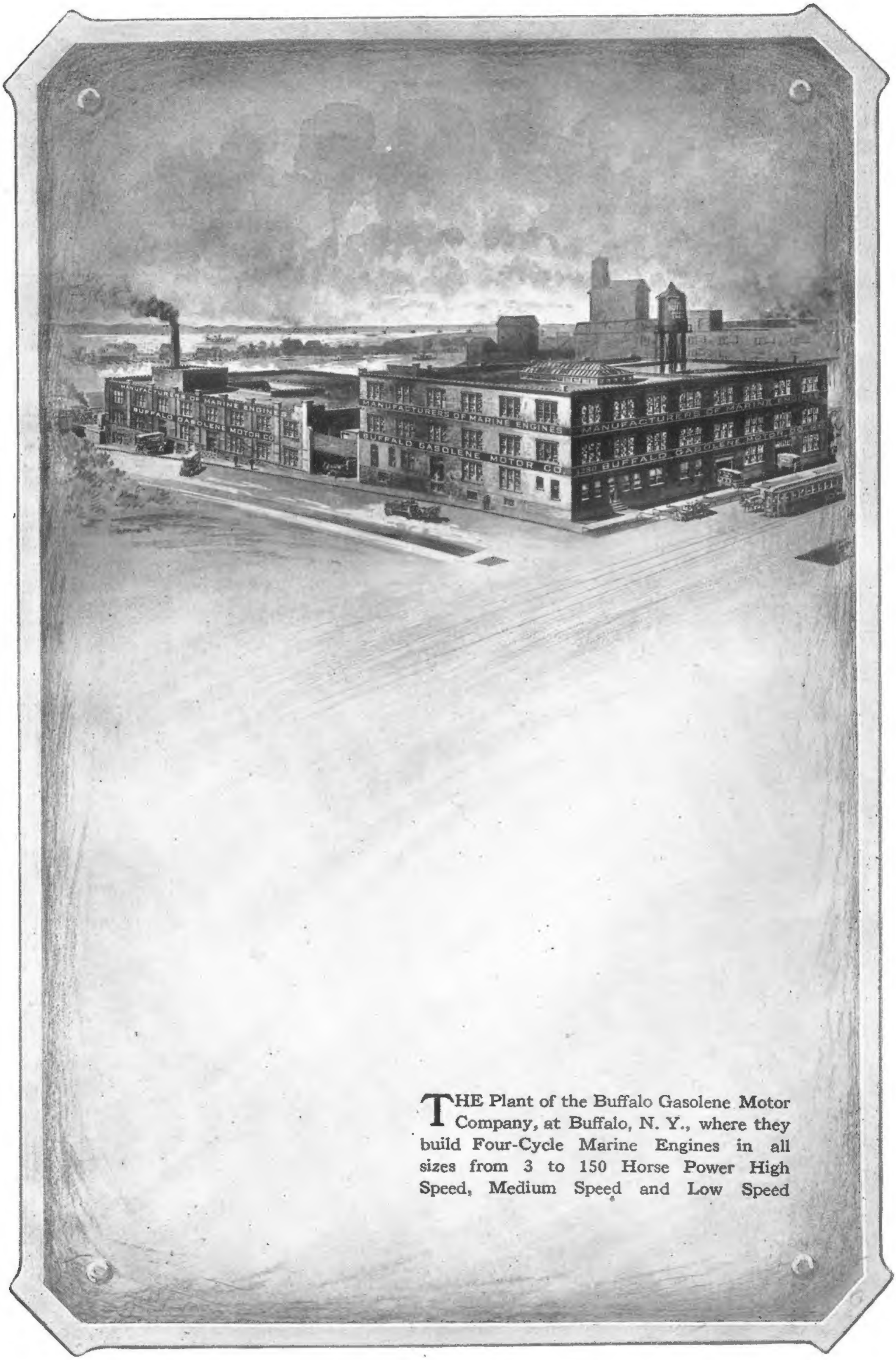
THE BUFFALO BOOK

IN WHICH IS ALSO INCLUDED
THE CATALOGUE OF THE

Buffalo Gasolene Motor Co.

Buffalo, N. Y.

BUILDERS OF BUFFALO MARINE ENGINES



THE Plant of the Buffalo Gasolene Motor Company, at Buffalo, N. Y., where they build Four-Cycle Marine Engines in all sizes from 3 to 150 Horse Power High Speed, Medium Speed and Low Speed

Pronouncement

THERE is more in business than an exchange of money for merchandise. There is more in manufacturing than material, equipment and labor.

It is a sort of corporate character, a house personality which shows in every detail of manufacturing and selling.

In this spirit careful manufacturing has its inception. It is apparent in the selling methods of the organization, in the way the makers stand behind their product.

It distinguishes the well-established, dependable house from the fly-by-nighter.

It marks the difference between flashy attempts at business getting and the steady growth and progress of the house which has found its place.

For 20 years the name Buffalo has stood for that which is best in marine engines. It has stood for all that is worth while in design, the best of materials, honest workmanship, careful inspection and most important of all, it stands for a spirit of fair dealing which holds that every Buffalo engine must give complete satisfaction and that it is the business of its makers to see that it does.

It is these things which have caused Buffalos to be known all over the world as "The Engine of Constant Service."


U.S.ENGINEER
DEPARTMENT

Buffalo Designs

For Boats of All Kinds

The interest of the Builders of Buffalo Engines is not confined to powering any one particular type of boat. The Buffalo line includes engines suitable to craft of all kinds from the 18 foot launch to large workboats, fast runabouts and cruisers. Because of this there is no chance that Buffalo salesmen will suggest a power plant which is unsuited to the particular boat in question, for in the first place they know boats, and in the second place making engines of practically all types, we would have no object in recommending anything but the one best suited to the needs of the case.

Cruiser and Runabout Type

Reliability and Endurance

The Buffalo Cruiser and Runabout Type is designed for cruisers and fast runabouts. They are sturdy engines of medium weight and speed, the idea being to produce an engine that would combine all the qualities of reliability and endurance under long strain which have made Buffalo Engines famous, and at the same time not exceed the weight limits of the fairly light cruising boat.

Sizes

These Cruiser and Runabout engines are built in four sizes. All are similar in the more important points of design, but there are some

details wherein the 16-20 H. P. and 25-30 H. P. differ in general appearance from the 40-60 H. P. and the 50-80 H. P. so both models are reproduced on other pages of this book.

Some Points of Construction

Base and Crank Chamber

Base and crank chamber can be supplied in either iron or aluminum, but iron is considered as regular equipment. The base is of the solid extension type. There are three main crankshaft bearings lined with removable die-cast babbitt.

Cylinders

Cylinders are of close grained gray iron, cast in pairs. They are thoroughly water jacketed and have large inspection panels which simplify cleaning the water jackets. All cylinders are first rough machined and heat treated, then finish machined and water tested.

Crankshaft

The crankshaft is of forged alloy steel, heat treated, all journals and pins being ground to size. It has large diameter giving not only increased strength but greater bearing surface. On the 40-60 H. P. and the 50-80 H. P. the camshaft is operated by a silent chain drive which also operates the water pump and magneto.

Pistons

The pistons are of gray iron, machined, heat treated and carefully balanced. Each piston pin is clamped to the upper end of the connecting rod and oscillates in bearings in the piston. The drop forged connecting rods have removable die cast bearings at the lower ends, the upper end being clamped to the hardened and ground steel piston pin.

Lubrication

In the lubrication system of the Cruiser and Runabout models there is some difference between the two smaller and two larger sizes which necessitates describing them separately.

Smaller Cruiser and Runabout Engines

Constant Level Splash System

The 16-20 H. P. and 25-30 H. P. are equipped with a constant level splash system by which the oil is drawn from a sump under the base by means of a plunger pump and discharged through a sight feed glass into a distributing pipe which supplies the splash pockets into which the connecting rods dip. The proper oil level is maintained by dams which are arranged so that the oil in the base maintains a constant level with the result that the connecting rods will splash only to a uniform depth. An oil level gauge indicates the quantity of oil in the sump.

Oil Level Gauge

Splash and Stream

On the 40-60 H. P. and 50-80 H. P. models all crankshaft bearings, connecting rod bearings and camshaft bearings are oiled by a constant level splash system, and the cylinders are lubricated by means of an oil pump, through sight feed glasses mounted where the feeding of the oil can be readily observed. The oil is circulated by means of a pump which draws the oil from

Oil Cooler

the reservoirs in the bottom of the base and pumps it through a cooler at the after end of the engine. This cooler is cold-water-jacketed and cools the oil before it is forced through the double discharge pipe, one branch of which connects with the sight feed glasses through

Sight Feed

which the oil passes to the cylinders, and the other supplies the pipe in the base which sprays oil on the connecting rods and keeps the oil troughs into which the connecting rods dip well filled.

Double Ignition System

Ignition

All the Cruiser and Runabout models are equipped with a double high tension system of ignition which includes a battery distributor system for starting and magneto for running. These two systems are entirely independent of each other even to separate sets of spark plugs so that if one gets out of order the other is always

there to fall back on. All wiring is enclosed in a metal tube above the cylinders.

Reverse Gear

The reverse gear is of the multiple disc type mounted in a solid extension base. It is completely enclosed in an oil tight casing, but at the same time it is easily accessible.

Valves and Push Rods

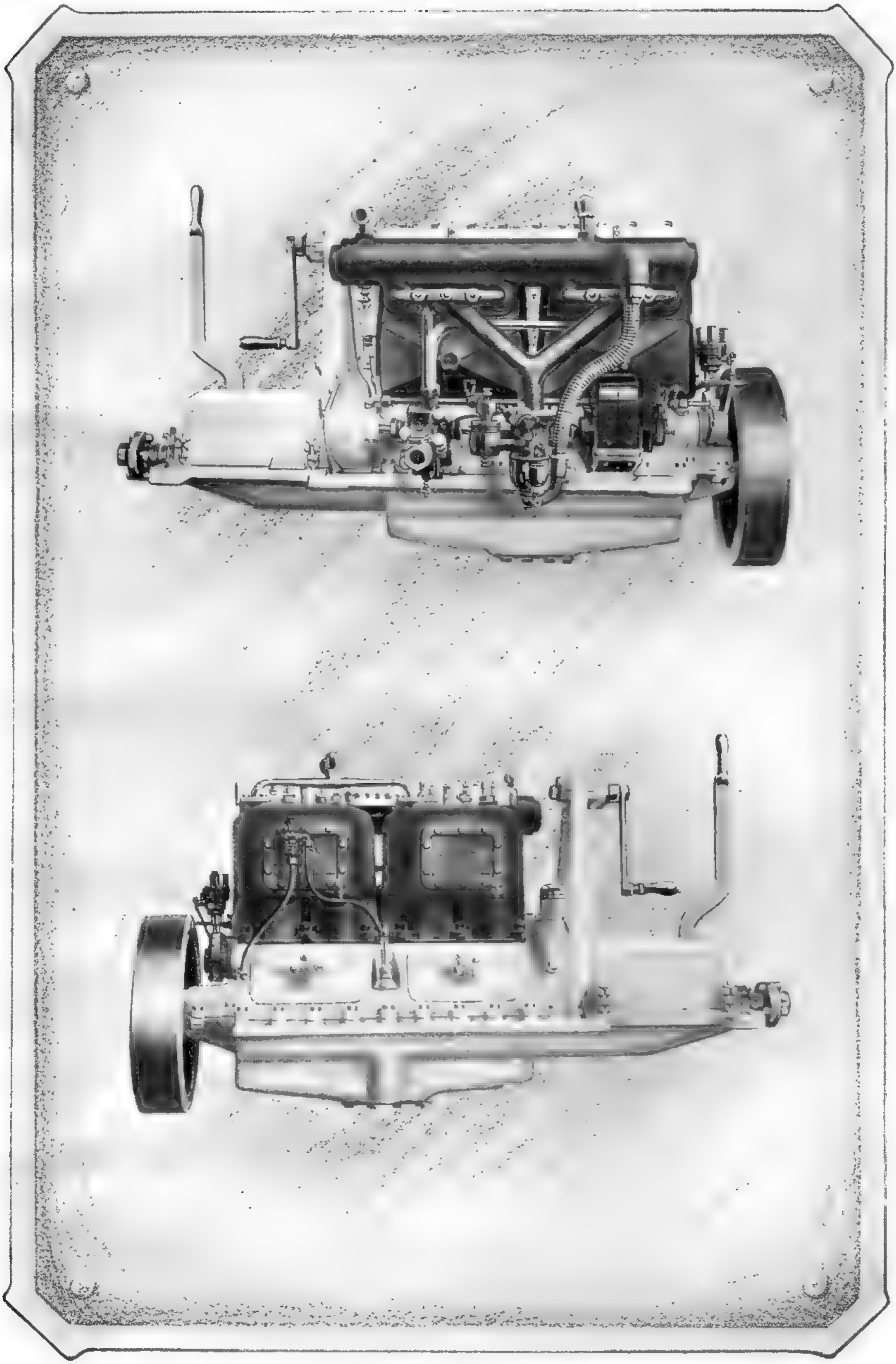
The Cruiser and Runabout models are supplied with valves of ample size. Push rods are of the inverted mushroom type. All valves and gears are enclosed. The exhaust manifold is so arranged that the exhaust line may be taken from either end. The exhaust manifold is water jacketed and has a warm air chamber from which warm air is supplied to the carburetor.

Starting Device

The 16-20 H. P. and 25-30 H. P. Cruiser and Runabout models have a sprocket-and-chain anti-kick-back rear starting device included in their regular equipment. They are also arranged to be started at the forward end.

Other Starters

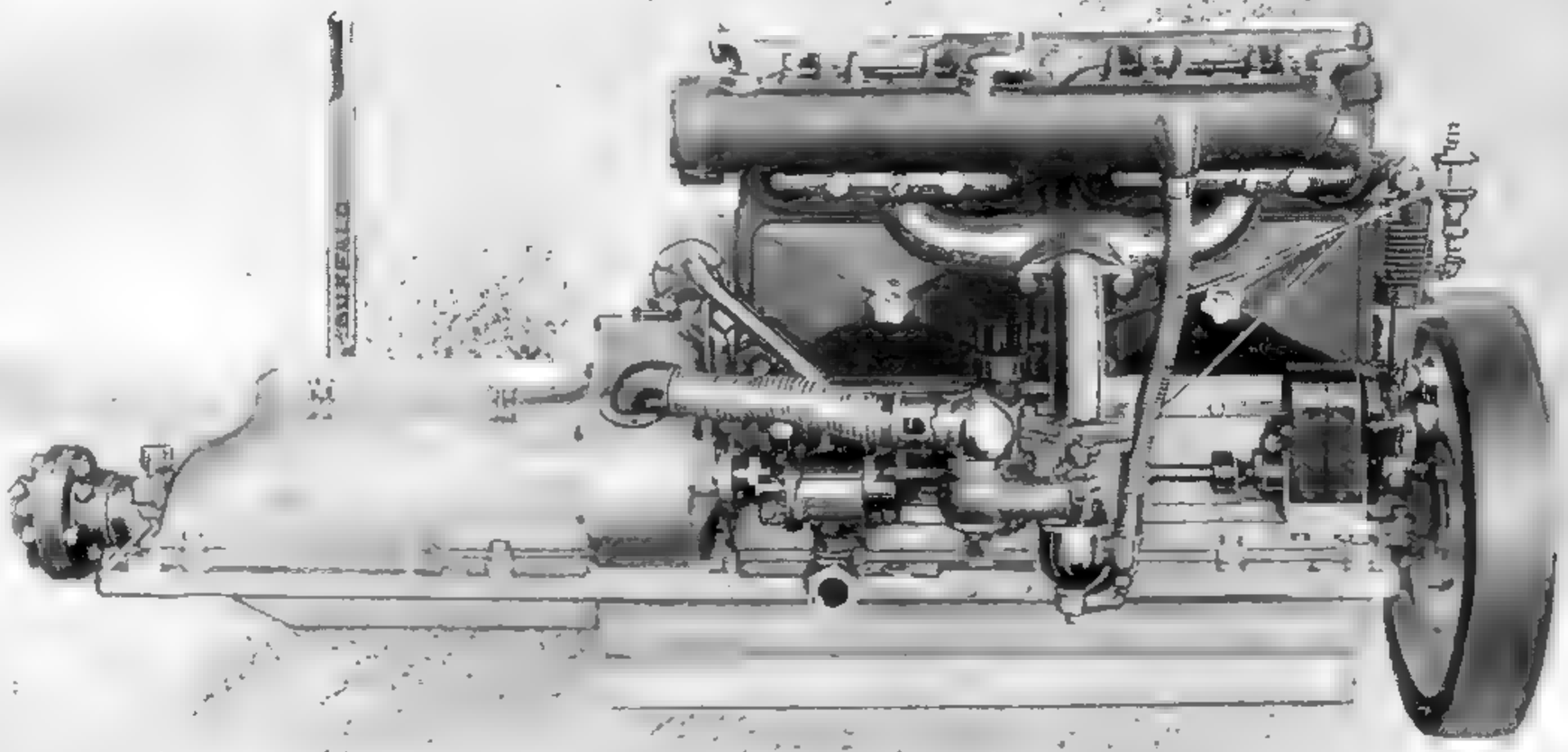
The two larger models are supplied with ratchet and lever, and any of these models can be equipped with electric starters similar to those shown on pages of this book devoted to the subject of starters.

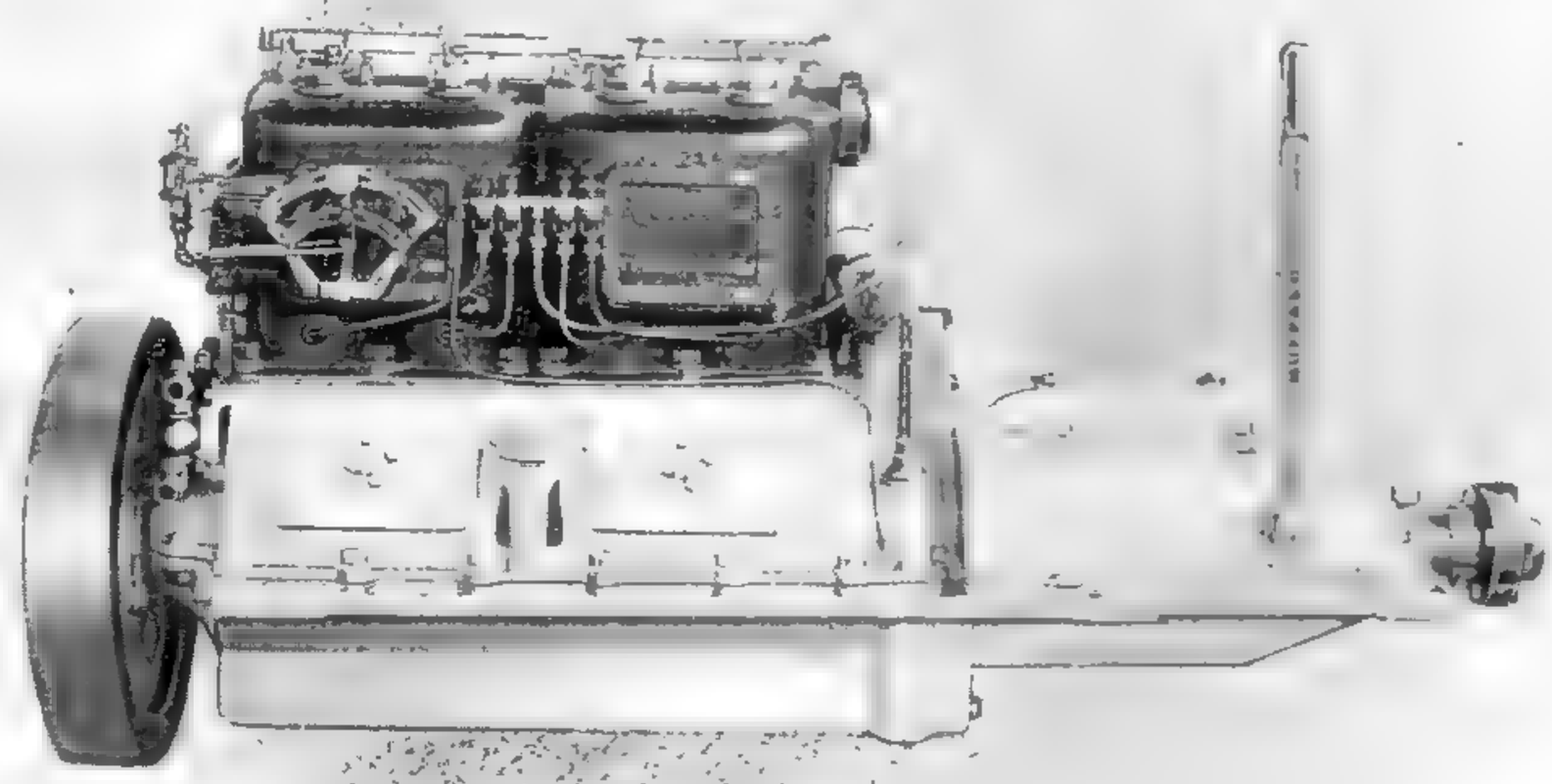


CRUISER AND RUNABOUT TYPE

	16-20 H. P.	25-30 H. P.
Cylinders	4	4
Bore	3¾"	4 3/16"
Stroke	5"	5"
Piston displacement	220.89 cu. ins.	354.41 cu. ins.
Weight with reverse gear (aluminum base)	560 lbs.	745 lbs.
Weight with reverse gear (iron base)	710 lbs.	929 lbs.
Diameter of flywheel	16"	17¼"
Diameter of crankshaft	1¾"	1 7/8"
Height, center of crank up	22⅞"	23⅞"
Distance, center of crank down	8⅛"	8⅛"
Width of space between foundation blocks	13"	13½"
Width of base over all	16"	17"
Length of motor over all	56 7/16"	59 9/16"
Width over all — Port side	8"	8½"
Width over all — Starboard side	11⅞"	14½"
Length of foundation of reverse gear motor	45 7/16"	46½"
Length of foundation of single motor	29¼"	32¼"
Speed — Normal	800 r. p. m.	800 r. p. m.
Speed — Minimum	100 r. p. m.	100 r. p. m.
Diameter of exhaust pipe	2"	2"
Diameter of propeller shaft	1"	1¼"
Diameter of propeller	16" 3-blade	18" 3-blade
Length of shaft furnished	10 ft.	10 ft.
Starting device	Crank and rear starter	Crank and rear starter
Wire furnished — Primary	Necessary	Necessary
Wire furnished — Secondary	Necessary	Necessary
Size sea cock	¾" i. p. s.	1" i. p. s.
Diameter of pipe for fuel connection	⅛" i. p. s.	⅛" i. p. s.
Lubrication	Constant level splash	Constant level splash
Water pump (gear type)	¾" intake	1" intake
Carburetor	1"	1¼"
Shaft coupling	Flange	Flange
Distance center of shaft down to top of foundation blocks	15/16"	15/16"
Distance between foundation bolts	14¾"	15⅝"

For further engine measurements, see page 30





CRUISER AND RUNABOUT TYPE

	40-60 H. P.	50-80 H. P.
Cylinders	4	4
Bore	5½"	6¾"
Stroke	7"	9"
Piston displacement	665.23 cu. ins.	1288.25 cu. ins.
Weight (aluminum)	1430 lbs.	2100 lbs.
Weight (iron)	1730 lbs.	2600 lbs.
Diameter of flywheel	20" or 22"	26" or 28"
Diameter of crankshaft	2⅜"	2¾"
Height, center of crank up	25"	30¾"
Distance, center of crank down	8¼"	9¾"
Width of space between foundation blocks	14¾"	18¼"
Width of base over all	19 11/16"	23½"
Length of motor over all	76⅞"	88"
Length of foundation of reverse gear motor	61 7/16"	70⅝"
Length of foundation of single motor	38"	45⅜"
Width over all — Port side	9½"	11¾"
Width over all — Starboard side	20¾"	23 9/16"
Speed — Normal	600 to 900 r. p. m.	500 to 800 r. p. m.
Speed — Minimum	100 r. p. m.	100 r. p. m.
Diameter of exhaust pipe	2½"	3"
Diameter of propeller shaft	1½" or 1¾"	1¾" or 2"
Diameter of propeller	22" to 26"	24" to 28"
Length of shaft furnished	10 ft.	10 ft.
Starting device	Ratchet and lever	Ratchet and lever
Wire furnished — Primary	Necessary	Necessary
Wire furnished — Secondary	Necessary	Necessary
Size sea cock	1"	1¼"
Diameter of pipe for fuel connection	⅜" i. p. s.	⅜" i. p. s.
Lubrication	Constant level splash and stream feed	Constant level splash and stream feed
Water pump (gear)	1" intake	1¼" intake
Carburetor	2"	2½"
Air pump (plunger type)	⅜" i. p. s.	⅜" i. p. s.
Coupling	Flange	Flange
Distance, center of shaft down to top of foundation blocks	1⅛"	1½"
Distance between foundation bolts	17⅜"	21"

For further engine measurements, see page 30

Heavy Duty Models

For Sturdy Boats

Buffalo Heavy Duty Engines are known the world over. Wherever there is navigable water they are powering work boats or pleasure boats of the heavier type, giving steady, reliable service under all conditions day after day.

Reliable Service

The Buffalo Heavy Duty models are the sturdy work horses of the Buffalo line. Endurance, steady, reliable service and economy are the points which are given first place in their designing rather than light weight or beautiful lines, and the result is that Buffalo Heavy Duty Engines are usually the choice of the boat owners who have real work to do. These engines are powering boats of so many kinds that it would be next to impossible to name them all, every kind from a ferry boat used to carry trolley cars across the Ohio River to sturdy little open launches. All kinds of work boats such as tugs, fishing boats, small freighters, oyster dredges, cannery tenders, seine boats and passenger boats, to say nothing of the thousands of beautiful yachts and cruisers which have found their ideal power plant in a Buffalo Heavy Duty engine. These engines are also used as auxiliary power on large ships with great success.

Powering Car Ferry

Auxiliary Power

Built For Strength

Strength

Buffalos of the Heavy Duty type are liberal in weight to meet the need of strength and good service called for by the kind of work the engine is required to do, but they are not need-

lessly heavy. The idea is simply to supply the sturdiest possible kind of an engine and whatever weight is needed to produce this result is put into it.

The Buffalo Heavy Duty Type consists of nine sizes as shown in detail elsewhere in this book.

Two Styles

These engines are built in two, four and six cylinders. With the exception of two sizes they all follow the same general style, what few minor differences there are being due to the addition of more cylinders or the particular requirements of an engine of one size as distinguished from those of another. The two sizes which differ from the general type are the four and six cylinder models with 10 in. bore and 12 in. stroke rated at 85-100 H. P. and 125-150 H. P. These two models have so many points in which they differ from the regular Heavy Duty line that it will be necessary to describe them separately.

Heavy Duty Models Below 85 H. P.

Cylinders

The cylinders are cast in pairs from close grained gray iron, machined, heat treated, finish machined and water tested. They are supplied with large inspection panels for cleaning the water jackets.

Base and Crank Chamber

The base and crank chamber are of iron. There are unusually long crankshaft bearings, a point which is of great importance in work of the kind these engines are intended for.

Crankshaft

The crankshaft is made of a special alloy steel, a large factor of safety being allowed. All bearings and crank pins are true to size so that the crankshaft is interchangeable.

Cooling System

A complete system of water jacketing keeps the engine properly cooled at all times, water for cooling being supplied through a bronze plunger pump running at camshaft speed. The water jacketed exhaust manifold is fitted with a chamber from which heated air is supplied to the carburetor.

Pistons and Connecting Rods

The pistons are of gray iron, machined, heat treated and carefully balanced. The rings are above the piston pin. The connecting rods are drop forged from O. H. steel of "H" section fitted with detachable bronze boxes, babbitt lined and have bronze bushings at the upper ends. Piston pins are of steel, hardened and ground and held in place by lock rings passing around the ends. The connecting rod bolts are of alloyed stock heat treated.

Lubrication

Lubrication is by means of multiple feed mechanical oiler attached to the cylinder. By this oiler oil is forced to every point where it is needed, through separate feed tubes, each feed tube having a separate pump. In this way all cylinders and bearings are thoroughly lubricated, the oil flowing back into the base from where it is returned to the oiler by a pump. Lubrication to crank pins is by means of Buffalo ring oilers.

Various Points of Construction

Ignition

The Heavy Duty Models, like the Cruiser and Runabout Type, are supplied with a double system of ignition, a battery distributor system for starting and magneto for running. These two systems are entirely separate even to having different spark plugs, so if one system gets out of order the other is there to fall back upon. Make-and-break ignition can be supplied if preferred.

Reverse Gear

The reverse gear is of the expanding wing type for the go-ahead, the back up being effected by a planetary gear system operated by a babbitted band outside the drum. The planetary gears are of steel, bronze bushed, running on hardened and ground steel gear pins. The whole reverse gear is covered with an easily removable oil-tight hood.

Compression Relief Cocks

The compression relief cocks for easy starting on the 13-15 H. P., 20-22 H. P., 26-30 H. P., 40-45 H. P. and 60-70 H. P. are piped together so no fumes can escape into the cabin.

Pumps

The Heavy Duty Models of this type are equipped with a bronze plunger water pump, bronze plunger bilge pump, and a bronze pump for returning the oil from the base to the oiler

Starting Device

The regular equipment for these models includes a ratchet and lever for starting, but air starter can be supplied on all but the two cylinder models, and all models can be equipped with electric starters.

Flywheel

The flywheel is balanced by the running balance method.

Governor

The four and six cylinder Heavy Duty models are equipped with a horizontal governor driven by helical gears, all parts being enclosed in an oil-tight casing. This governor is connected to the throttle lever at the forward end, and by means of it the engine speed is regulated so that the governor will govern at practically the speed the engine is running when the clutch is disengaged.

85-100 and 125-150 H. P. Heavy Duty Models

Cylinders

Cylinders are cast in pairs, from close grained gray iron, and have removable heads.

Base and Crank Chamber

The lower half of the base containing the crankshaft and bearings is of cast steel, the reverse gear, which is of the multiple disc type, being carried on angle irons and enclosed on the under side by a brass oil pan, as is also the entire engine base. The crank case is made up of cast steel sections and has large inspection panels.

Crankshaft

The crankshaft and connecting rods are hammer forged. The connecting rods are provided with adjustable bronze bearings both on the crankshaft and piston pin, the crankshaft bearing being babbitt lined.

Pistons

The pistons are similar to those used on other Buffalo Heavy Duty models. Piston pins are of steel, hardened and ground and held in place by a lock ring passing around the end.

Valves

The valves and valve springs while enclosed are easily accessible by plates and inspection plugs. The valve stems are of carbon steel fused into gray iron heads. They are operated by hardened and ground steel cams, keyed and taper pinned to the camshaft, and operated in connection with the Buffalo type of rocker arm. The valve timing gears are of steel with helical teeth, the intermediate gear being adjustable.

Camshaft

The camshaft is of forged steel with flange forged integral to the shaft for carrying the camshaft gear.

Lubrication

Lubrication is carried on by a force feed mechanical oiler and in a general way is similar to that used on the other Buffalo Heavy Duty models.

Ignition

There is a double high tension system of ignition, a battery distributor system for starting and magneto for running. These two systems are entirely separate even to different sets of plugs.

Starting Device

Both these models include an air starting device as their regular equipment. There is also an auxiliary hand starting device.

Parts as Numbered on Blueprint of Heavy-Duty Motor—Sectional View

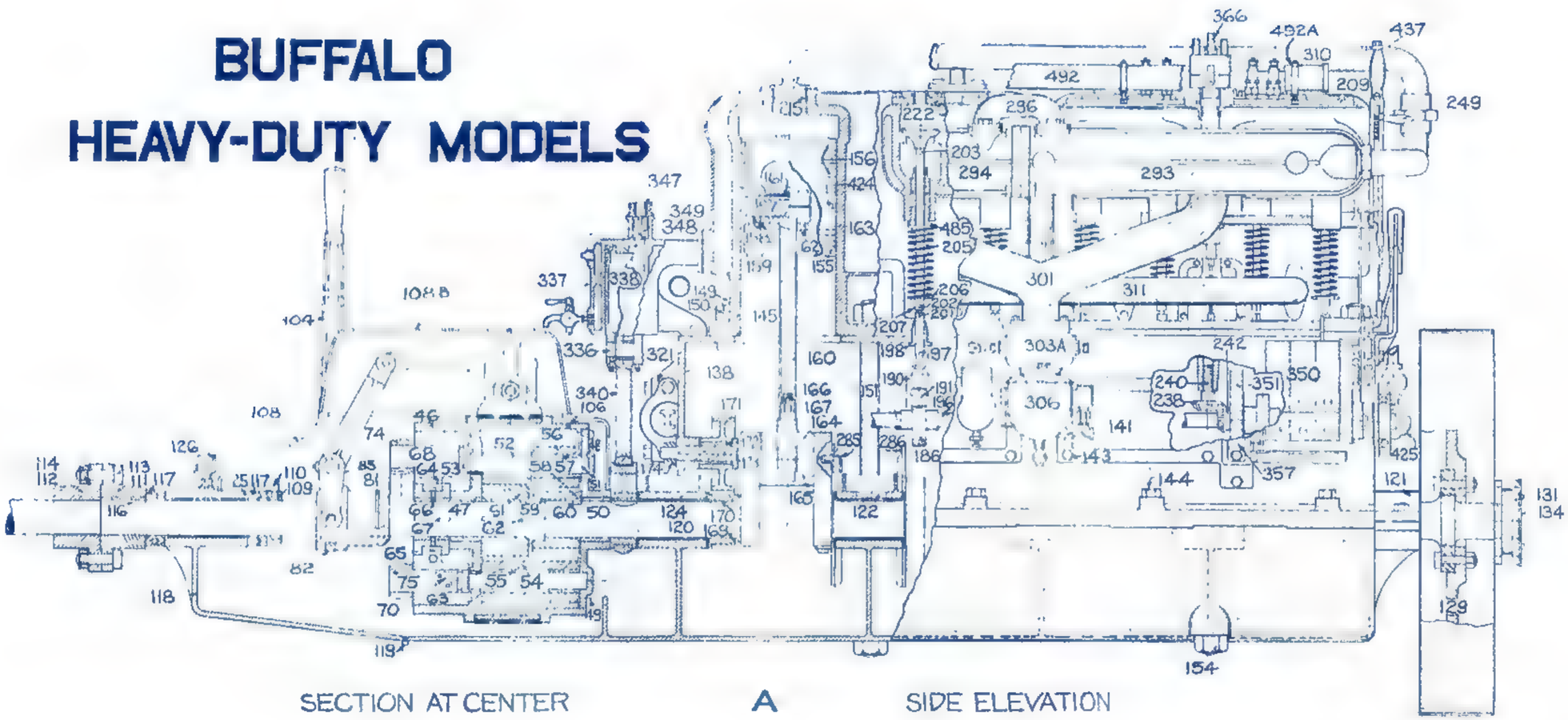
46—Reverse gear shell
47—Reverse gear shell bushing
48—Reverse gear shell cover
49—Reverse gear shell cover screw
50—Reverse gear shell cover bushing
51—Planetary gear pin
52—Planetary gear pin collar
53—Planetary gear pin dowel screw
54—Long planetary gear
55—Long planetary gear bushing
56—Short planetary gear
57—Short planetary gear bushing
58—Bushed gear on crankshaft
59—Bushed gear bushing
60—Bushed gear key
61—Tailshaft gear
62—Tailshaft gear key
63—Reverse gear wings
64—Release spring for wings
65—Reverse gear dog
66—Reverse gear dog set screw
67—Reverse gear dog key
68—Reverse gear cam pin
70—Hardened steel plate for cam pin
74—Cam pin lever
75—Cam pin lever key
81—Reverse gear bobbin
82—Brass shifting yoke
85—Clutch fork
96—Reverse band
106—Oil filling plug for reverse gear
107—Tailshaft
108—Reverse gear hood
109—Set collar
110—Set collar screw
111—Shaft coupling for tailshaft
112—Shaft coupling for propeller shaft
113—Flange coupling bolt
114—Flange coupling bolt nut
115—Flange coupling set screw
116—Flange coupling key
117—Ball thrust collar
118—Reverse gear base
119—Reverse gear base drain plug
120—Crankshaft
121—Tailshaft bearing cap
122—Center and rear bearing cap
123—Forward bearing cap
126—Grease cup
129—Flywheel
131—Starting ratchet
134—Starting ratchet guard
138—Crankchamber
141—Magneto panel
143—Crankchamber panel screw
144—Crankchamber base screw
145—Cylinder
149—Cylinder stud
150—Cylinder stud nut
151—Cylinder uprights
154—Cylinder upright nut
155—Piston
156—Piston rings
157—Piston pin
158—Piston pin set screw
159—Piston pin set screw cotter pin
160—Connecting rod
161—Upper connecting rod bushing
162—Upper connecting rod bolt
163—Upper connecting rod bolt nut
164—Connecting rod bearing (upper half)
165—Connecting rod bearing (lower half)
166—Lower connecting rod bolt
167—Lower connecting rod bolt nut
169—Crankshaft 2-1 gear
170—Crankshaft 2-1 gear key
171—Intermediate 2-1 gear
172—Intermediate gear bushing
173—Intermediate gear stud
174—Intermediate gear stud nut
185—Valve camshaft
186—Valve cam
190—Valve lifter lever
191—Valve lifter lever roller
197—Valve push rod
198—Valve push rod bushing
201—Valve push rod adjusting screw lock nut
202—Valve push rod adjusting screw
203—Valve
205—Valve spring
206—Valve stem guide
207—Valve spring washer
208—Exhaust valve plug
215—Cylinder inspection plug
222—Inlet valve plug
238—Timer shaft bevel gear
240—Timer shaft
242—Timer shaft bevel gear on camshaft
249—Spark shifting lever
285—Oil rings
286—Oil ring screws
293—Exhaust manifold
294—Exhaust manifold rear section
296—Water jacket connector for exhaust manifolds
301—Gas intake manifold
303—Governor throttle valve
306—Carburetor
310—Water overflow manifold
311—Water inlet manifold
321—Water pump
336—Air pump plunger pin
337—Air pump body
338—Air pump plunger
340—Air pump eccentric strap
347—Air pump discharge valve cap
348—Air pump discharge valve
349—Air pump discharge valve spring
350—Magneto
351—Magneto gear on camshaft
357—Magneto gear guard
366—Distributor
424—Piston pin lock ring
425—Bilge pump
437—Throttle lever
471—Governor control lever

Parts as Numbered on Blueprint of Cruiser and Runabout Engine—Sectional View

16-20 H. P. and 25-30 H. P.

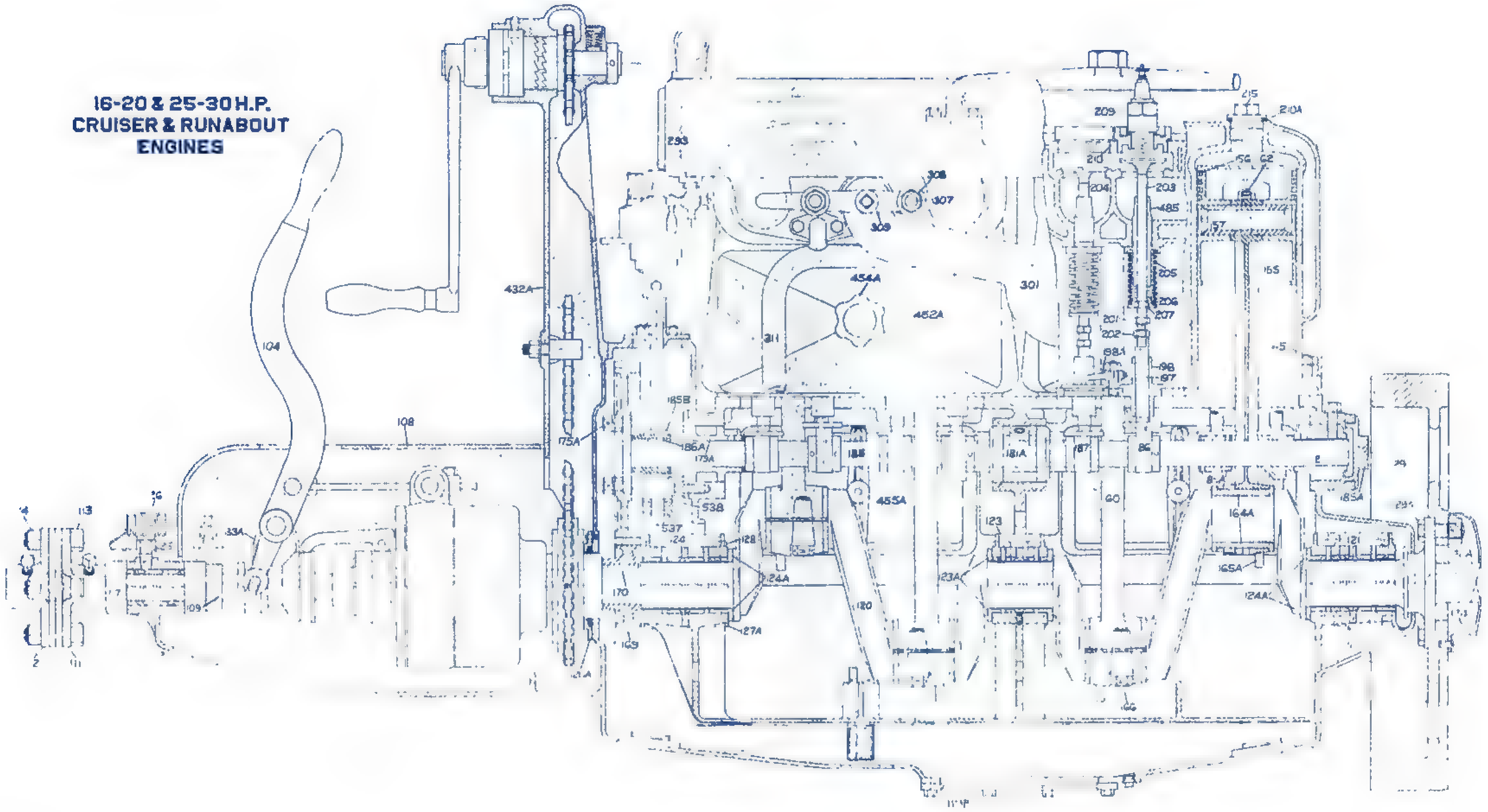
83A-Reverse shaft bracket
104—Reverse lever
108—Reverse gear hood
109—Set collar
111—Shaft coupling (tailshaft flange)
112—Shaft coupling (propeller shaft flange)
113—Bolt for shaft coupling
114—Bolt nut for shaft coupling
117—Ball thrust collar
119B-Oil pan panel
120—Crankshaft
120A-Packing gland
121—Forward bearing cap
123—Short center bearing cap
123A-Center bearing cap babbitt
124—Rear bearing cap
124A-Forward bearing cap babbitt
125—Tailshaft bearing cap
126—Grease cup
127A-Base cap bolt
128—Base cap bolt castled nut
129—Flywheel
129A-Flywheel bolt
130A-Flywheel bolt nut
134—Starting ratchet guard

BUFFALO
HEAVY-DUTY MODELS



SECTION AT CENTER **A** SIDE ELEVATION

16-20 & 25-30 H.P. CRUISER & RUNABOUT ENGINES



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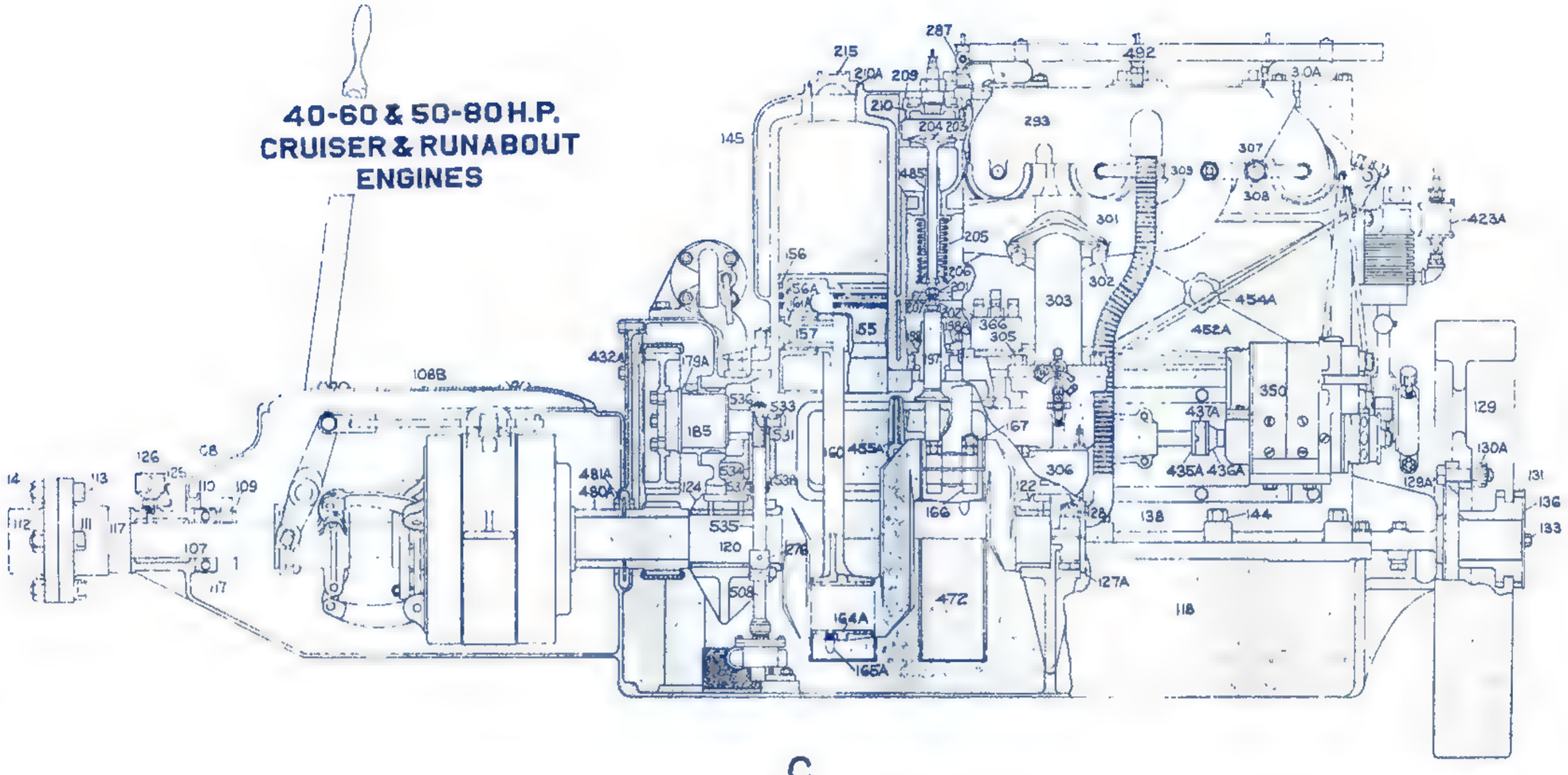
40-60 & 50-80 H.P. CRUISER & RUNABOUT ENGINES



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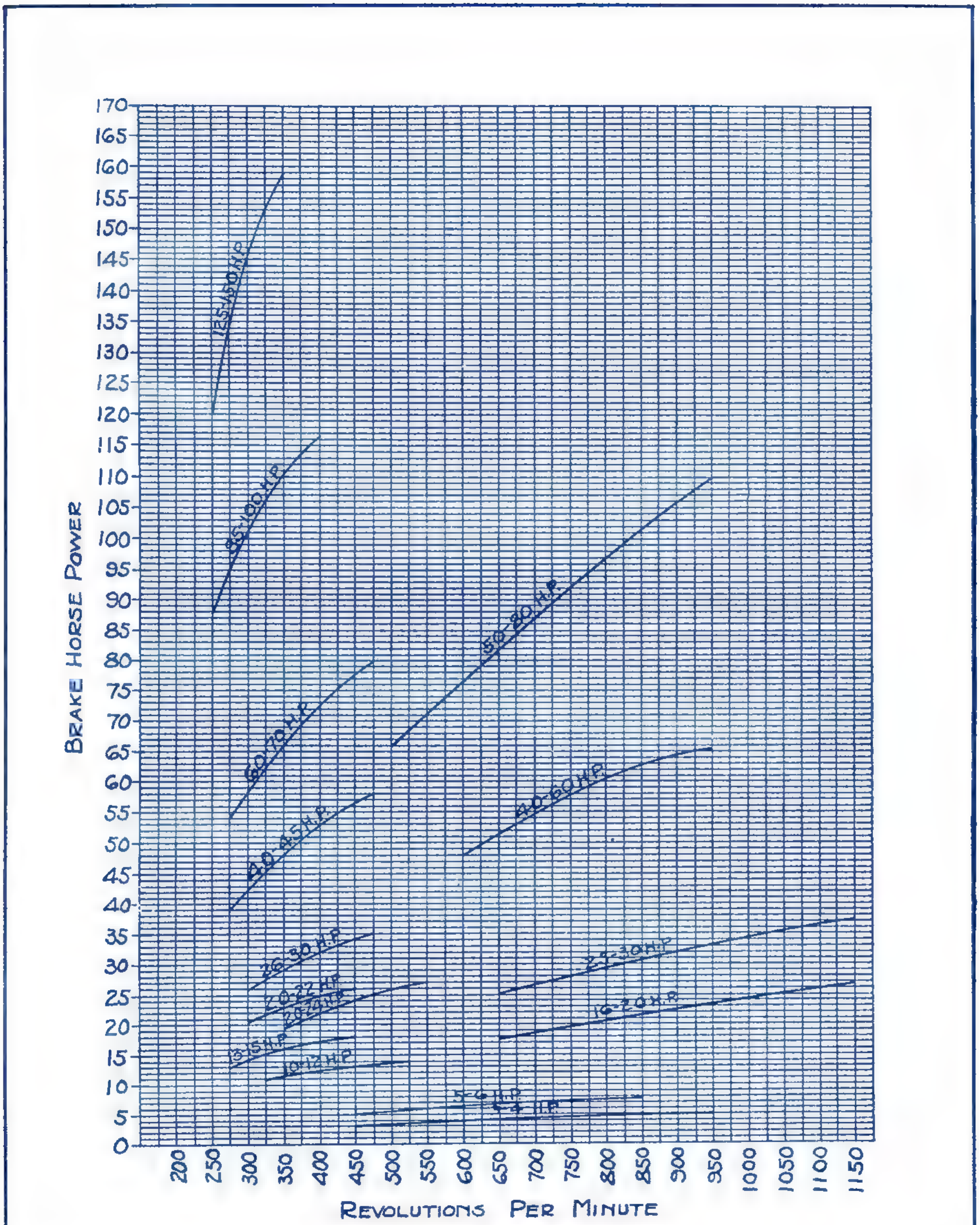
BRAKE HORSE POWER
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135-150 H.P.
85-100 H.P.
65-80 H.P.
60-70 H.P.
40-55 H.P.
30-40 H.P.
25-30 H.P.
20-25 H.P.
15-20 H.P.
10-15 H.P.
5-10 H.P.
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1100
1150
REVOLUTIONS PER MINUTE

(Continued from page 20)

Parts as Numbered on Blueprint of Cruiser and Runabout Engine—Sectional View

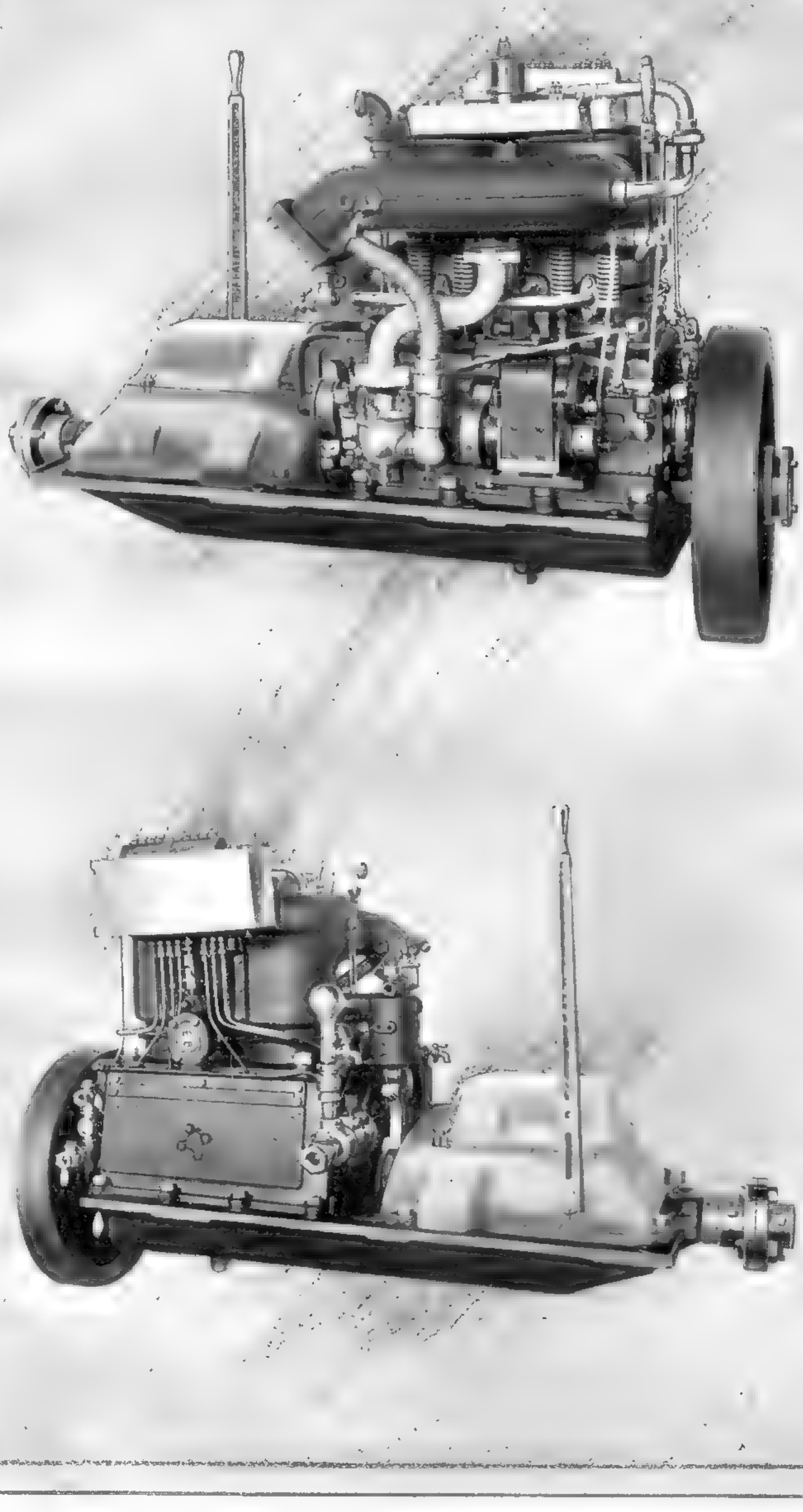
16-20 H. P. and 25-30 H. P.

145—Cylinder
155—Piston
156—Piston rings
156A-Narrow steel piston rings
157—Piston pin
160—Connecting rod
162—Upper connecting rod bolt
164A-Connecting rod die cast bearing
165A-Connecting rod splash pin
166—Lower connecting rod bolt
169—Crankshaft gear
170—Key for crankshaft gear
175A-Camshaft gear attaching screw
179A-Rear camshaft bearing
180A-Forward camshaft bearing
181A-Center camshaft bearing
185—Valve camshaft
185A-Camshaft cap
185B-Drive gear for oil pump
186—Inlet valve cam
186A-Oil pump drive gear key
187—Exhaust valve cam
197—Valve push rod
198—Valve push rod guide
198A-Valve push rod guide clamp
201—Valve push rod adjusting screw
202—Valve push rod adjusting screw lock nut
203—Inlet valve
204—Exhaust valve
205—Valve spring
206—Valve spring collar
207—Valve spring split washer
210—Valve plug gasket
210A-Cylinder inspection plug gasket
215—Cylinder inspection plug gasket
293—Exhaust manifold
301—Gas inlet manifold
307—Inlet and exhaust manifold clamp stud
308—Inlet and exhaust manifold clamp stud nut
309—Inlet and exhaust manifold clamp
311—Water inlet manifold
432A-Gear case panel
452A-Valve enclosing plate
454A-Valve enclosing plate nut
455A-Crankchamber panel clamp
485—Valve stem guide
537—Oil pump drive shaft set collar
538—Oil pump drive shaft thrust washer

Parts as Numbered on Cruiser and Runabout Engine—Sectional View

40-60 H. P. and 50-80 H. P.

107—Tailshaft
108—Reverse gear hood
108B-Reverse gear hood cover
109—Set collar
110—Set screw for set collar
111—Shaft coupling (tailshaft flange)
112—Shaft coupling (propeller shaft flange)
113—Bolt for shaft coupling
114—Bolt nut for shaft coupling
117—Ball thrust collar
118—Base (reverse gear)
120—Crankshaft
122—Long center bearing cap
124—Rear bearing cap
125—Tailshaft bearing cap
126—Grease cup
127A-Base cap bolt
128—Base cap bolt castled nut
129—Flywheel
129A-Flywheel bolt
130A-Flywheel bolt nut
131—Starting ratchet
133—Starting ratchet screw
136—Starting ratchet cap
138—Crankchamber
144—Crankchamber base screw
145—Cylinder
155—Piston
156—Piston rings
156A-Narrow steel piston rings
157—Piston pin
160—Connecting rod
161A-Piston pin bushing
164A-Connecting rod die cast bearing
165A-Connecting rod splash pin
166—Lower connecting rod bolt
167—Lower connecting rod bolt nut
179A-Rear camshaft bearing
185—Valve camshaft
197—Valve push rod
198—Valve push rod guide
198A-Valve push rod guide clamp
201—Valve push rod adjusting screw
202—Valve push rod adjusting screw lock nut
203—Inlet valve
204—Exhaust valve
205—Valve spring
206—Valve spring collar
207—Valve spring split washer
209—Valve port plug or cover plate
210—Valve plug gasket
210A-Cylinder inspection plug gasket
215—Cylinder inspection plug
276—Upright oiler shaft coupling
287—Priming cup
293—Exhaust manifold
301—Gas intake manifold
302—Inlet manifold screw
303—Inlet drop pipe
305—Carburetor flange screw
306—Carburetor
307—Inlet and exhaust manifold clamp stud
308—Inlet and exhaust manifold clamp stud nut
309—Inlet and exhaust manifold clamp
310A-Combination water overflow and wire tube support
350—Magneto
366—Distributor
423A-Oil cup
432A-Gear case panel
435A-Magneto coupling (male half)
436A-Magneto coupling (female half)
437A-Magneto coupling (center block)
452A-Valve enclosing plate
454A-Valve enclosing plate nut
455A-Crankchamber panel clamp
472—Connecting rod splash trough
480A-Clutch spacing collar
481A-Gear case oil ring
485—Valve stem guide
492—Wire tube
508—Oil circulating pump shaft
531—Oil pump spiral gear key
533—Oil pump spiral gear (driven)
534—Oil pump drive shaft bushing
535—Oil pump drive shaft
536—Oil pump drive shaft nut
537—Oil pump drive shaft set collar
538—Oil pump drive shaft thrust washer

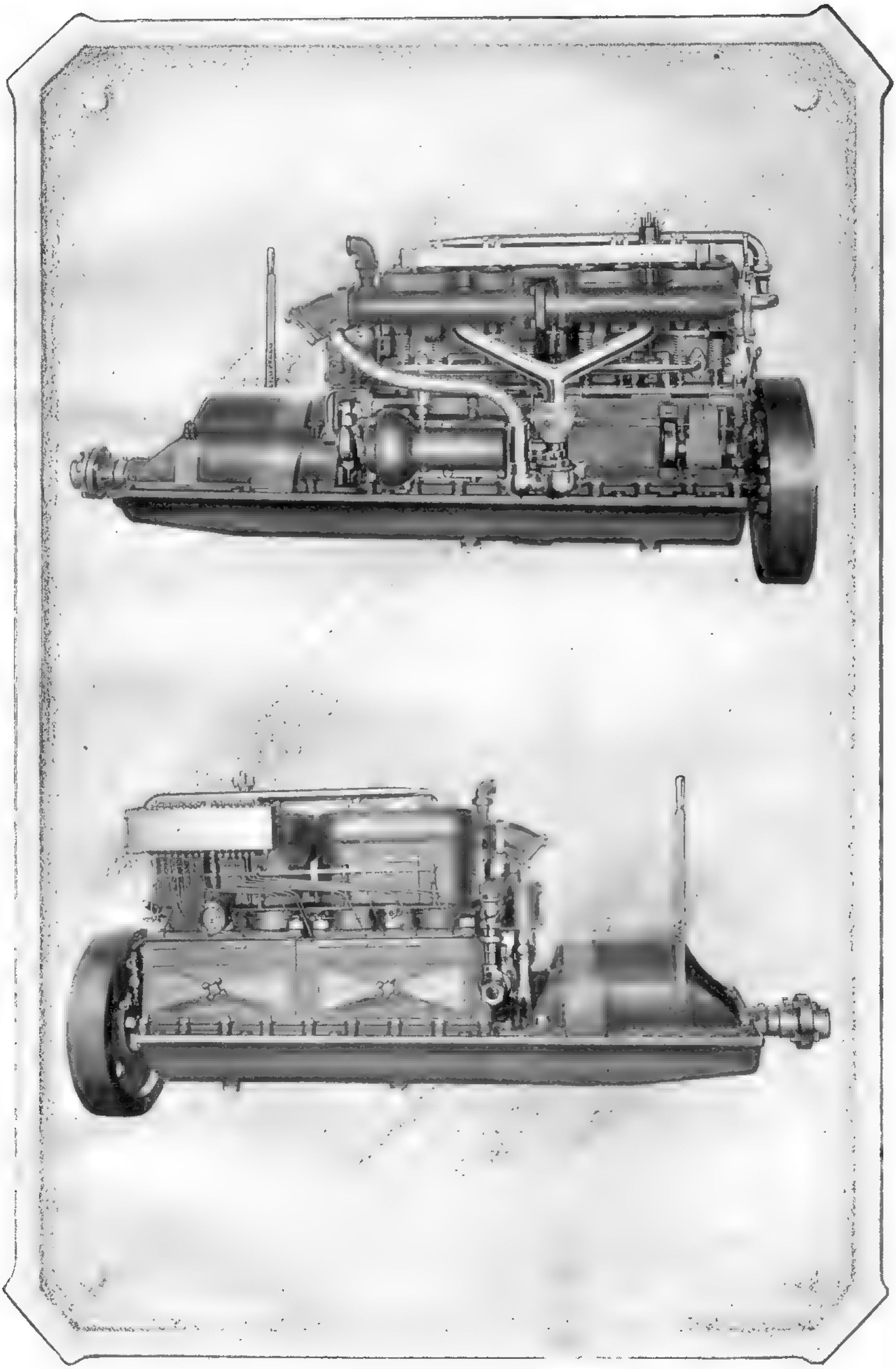


HEAVY DUTY

	10-12 H. P.	13-15 H. P.	20-22 H. P.
Cylinder	2	2	2
Bore	5″	6″	7″
Stroke	6½″	7½″	9″
Piston displacement	255.26 cu. ins	424.12 cu. ins	692.72 cu. ins.
Weight with reverse gear	1170 lbs.	1400 lbs.	2100 lbs.
Weight less reverse gear	920 lbs.	1100 lbs.	1800 lbs.
Diameter of flywheel	20″	23″	26″
Diameter of crankshaft	2″	2¼″	2 1/2″
Height, center of crank up	26″	30½″	36″
Distance, center of crank down	6⅝″	8⅜″	9 1/2″
Width of space between foundation blocks	13″	15″	17 1/2″
Width of base over all	17½″	20¼″	23 1/2″
Length of motor over all	60⅛″	64⅞″	74 1/4″
Length of foundation of reverse gear motor	45″	48⅜″	55⅞″
Length of foundation of single motor	19¾″	22⅜″	25⅞″
Width over all — Port side	10″	14″	15″
Width over all — Starboard side	14½″	16″	19″
Speed — Normal	400 r. p. m.	350 r. p. m.	350 r. p. m.
Speed — Minimum	100 r. p. m.	100 r. p. m.	100 r. p. m.
Diameter of exhaust pipe	2″	2″	2½″
Diameter of propeller shaft	1½″	1½″	1¾″
Diameter of propeller	22″ 3-blade / 24″ 2-blade	24″ 3-blade	28″ 3-blade
		26″ 2-blade	30″ 2-blade
Length of shaft furnished	10 ft.	10 ft.	10 ft.
Starting device	Ratchet and lever	Ratchet and lever	Ratchet and lever.
Wire furnished — Primary	Necessary	Necessary	Necessary
Wire furnished — Secondary	Necessary	Necessary	Necessary
Size sea cock	¾″	1″	1¼″
Diameter of pipe for fuel connection	⅛″ i. p. s.	⅛″ i. p. s.	⅛″ i. p. s.
Lubrication	7-feed mechanical lubricator and separate oil return pump	7-feed mechanical lubricator and separate oil return pump	7-feed mechanical lubricator and separate oil return pump
Water pump (plunger type)	¾″ intake	1″ intake	1¼″ intake
Carburetor	1¼″	1¼″	1½″
Air pump (plunger type)	⅜″ i. p. s.	⅜″ i. p. s.	⅜″ i. p. s.
Coupling	Flange	Flange	Flange
Distance center of shaft down to top of foundation blocks	13/16″	½″	½″
Distance between foundation bolts	15¼″	17½″″	21⅝″

For further engine measurements, see page 33

NOTE—Buffalo Heavy Duty engines are now equipped with Hot-Spot Manifold not shown in the picture.

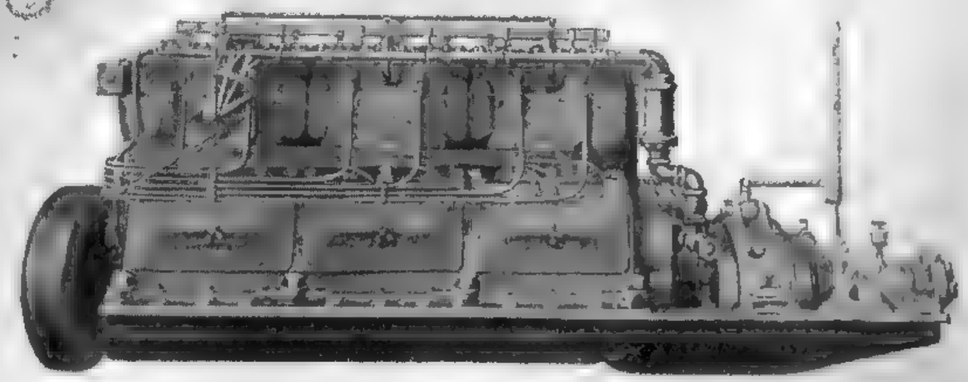


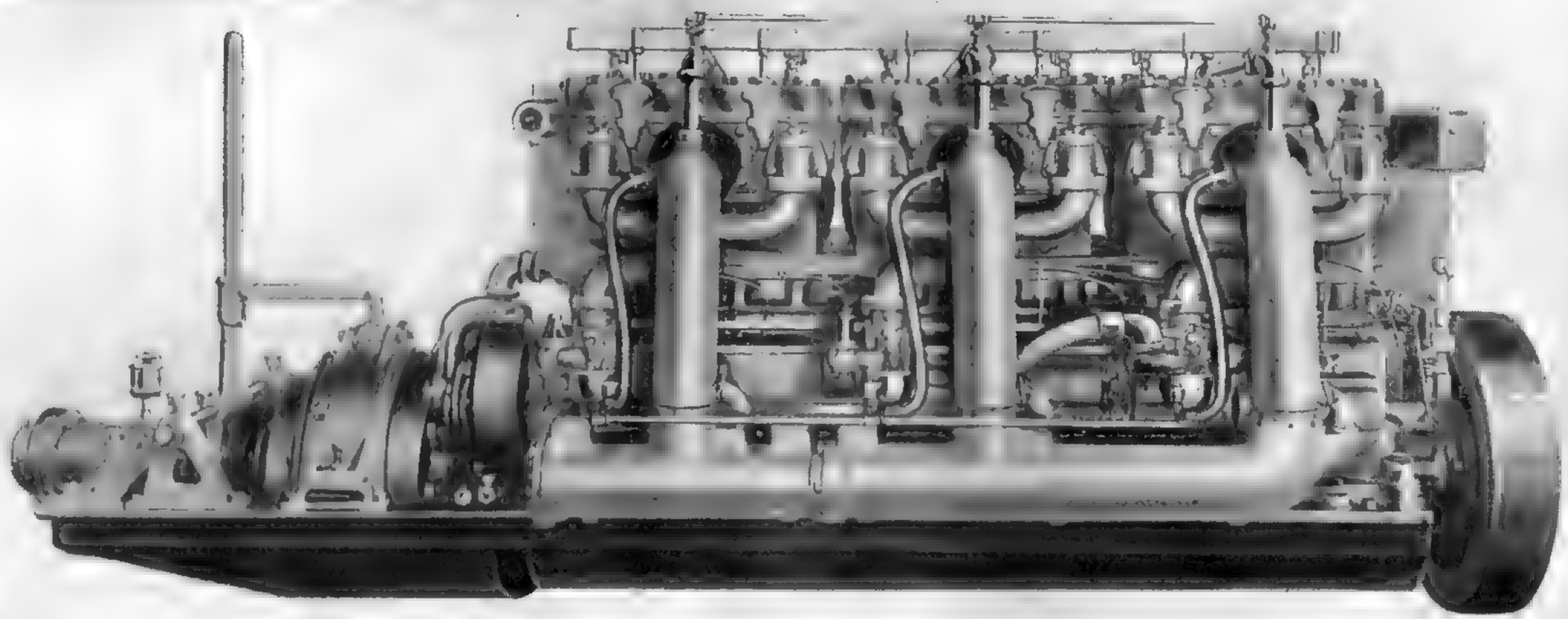
HEAVY DUTY

	20-24 H. P.	26-30 H. P.	40-45 H. P.	60-70 H. P.
Cylinders	4	4	4	6
Bore	5″	6″	7″	7″
Stroke	6½″	7½″	9″	9″
Piston displacement	510.51 cu. ins.	848.24 cu. ins.	1385.44 cu. ins.	2078.16 cu. ins.
Weight with reverse gear	1960 lbs.	2525 lbs.	3655 lbs.	4850 lbs.
Weight less reverse gear	1600 lbs.	2100 lbs.	3000 lbs.	4125 lbs.
Diameter of flywheel	20″	24″	28″	28″
Diameter of crankshaft	2″	2¼″	2½″	2¾″
Height, center of crank up	26″	30½″	36″	36″
Distance, center of crank down	6⅝″	8⅜″	10″	10″
Width of space between foundation blocks	14¾″	15″	17½″	19½″
Width of base over all	19 11/16″	20¼″	23½″	25½″
Length over all	85⅝″	92″	102″	132½″
Length of foundation of reverse gear motor	69⅝″	74″	83½″	113″
Length of foundation of single motor	39¼″	43⅝″	50⅛″	74⅜″
Width over all — Port side	10″	14″	15″	14″
Width over all — Starboard side	14½″	16″	19″	19″
Speed — Normal	400 r. p. m.	350 r. p. m.	350 r. p. m.	350 r. p. m.
Speed — Minimum	100 r. p. m.	100 r. p. m.	100 r. p. m.	100 r. p. m.
Diameter of exhaust pipe	2″ i. p. s.	2″ i. p. s.	2½″ i. p. s.	3″ i. p. s.
Diameter of propeller shaft	1¾″	2″	2¼″	2½″
Diameter of propeller	28″ 2-blade / 26″ 3-blade	30″ 3-blade / 32″ 3-blade	36″ 3-blade / 38″ 3-blade	40″ 3-blade / 42″ 3-blade
Length of shaft furnished	10 ft.	10 ft.	12 ft.	15 ft.
Starting device	Ratchet and lever	Ratchet and lever	Ratchet and lever	Ratchet and lever
Wire furnished — Primary	Necessary	Necessary	Necessary	Necessary
Wire furnished — Secondary	Necessary	Necessary	Necessary	Necessary
Size sea cock	1″	1¼″	1¼″	1½″
Diameter of pipe for fuel connection	⅛″ i. p. s.	¼″ i. p. s.	¼″ i. p. s.	⅜″ i. p. s.
Lubrication	13-feed mechanical lubricator and separate oil return pump	13-feed mechanical lubricator and separate oil return pump	13-feed mechanical lubricator and separate oil return pump	19-feed mechanical lubricator and separate oil return pump
Water pump (plunger type)	1″ intake	1¼″ intake	1¼″ intake	1½″ intake
Carburetor	1¼″	1½″	2″	Three 1½″
Air pump (plunger type)	⅜″ i.p. s.	⅜″ i. p. s.	⅜″ i. p. s.	⅜″ i. p. s.
Coupling	Flange	Flange	Flange	Flange
Distance center of shaft down to top of foundation blocks	1⅛″	½″	½″	5/16″
Distance between foundation bolts	17″	17½″	20¼″	22¼″

For further engine measurements, see page 32

NOTE—Buffalo Heavy Duty engines are equipped with Hot-Spot Manifold not shown in the picture.



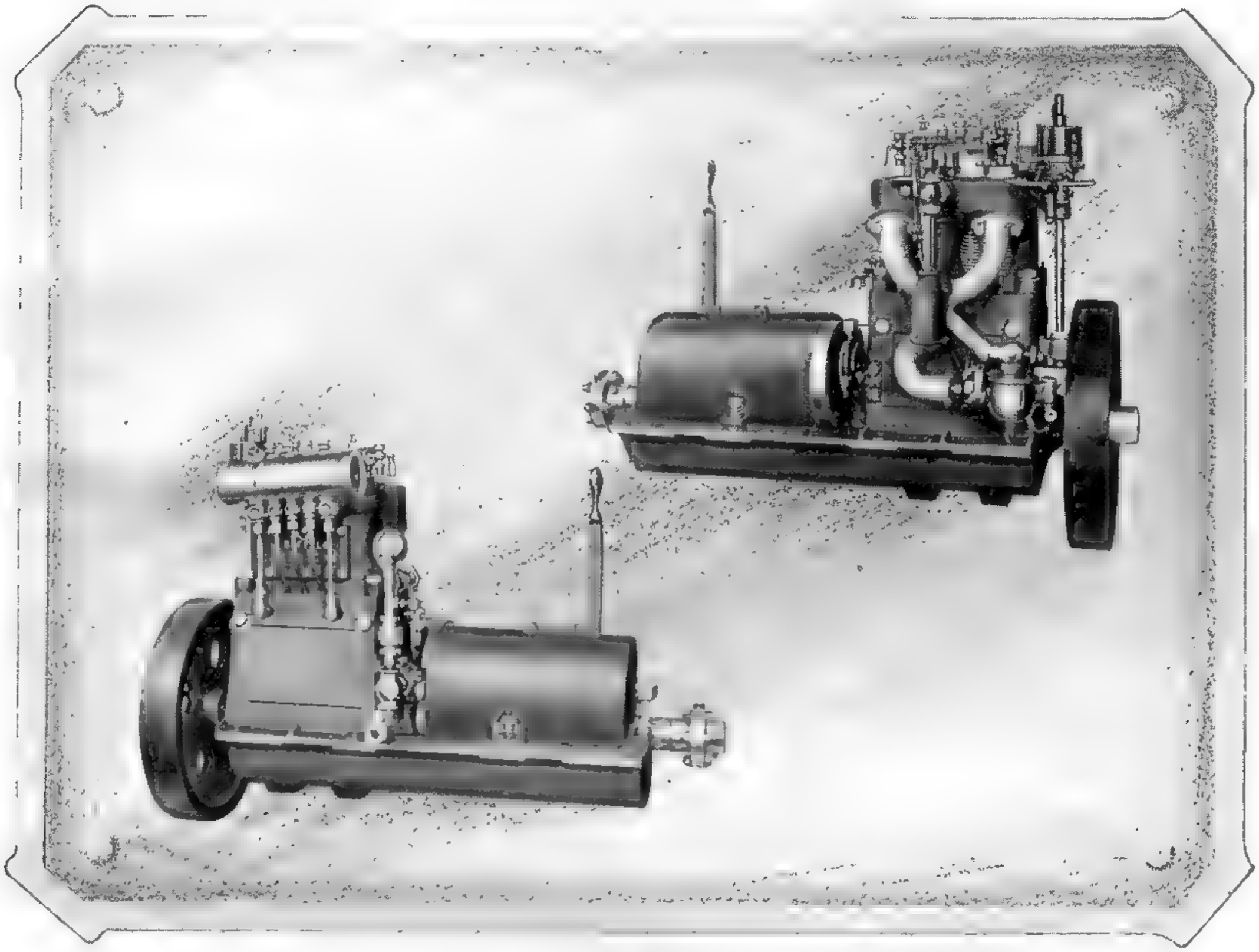


HEAVY DUTY

	85-100 H. P.	125-150 H. P.
Cylinders	4	6
Bore	10″	10″
Stroke	12″	12″
Piston displacement	3769.92 cu. ins.	5654.88 cu. ins.
Weight with reverse gear	8200 lbs.	12800 lbs.
Weight less reverse gear	6700 lbs.	10500 lbs.
Diameter of flywheel	34″	34″
Diameter of crankshaft	4″	4″
Height, center of crank up	49″	49″
Distance, center of crank down	14¼″	14¼″
Width of space between foundation blocks	25⅝″	25⅝″
Width of base over all	32″	32″
Length of motor over all	145⅛″	176⅛″
Length of foundation of reverse gear motor	111½″	142½″
Length of foundation of single motor	66¼″	97¼″
Width — Port side	14″	14″
Width — Starboard side	30″	30″
Speed — Normal	300 r. p. m.	300 r. p. m.
Speed — Minimum	100 r. p. m.	100 r. p. m.
Diameter of exhaust pipe	5″ i. p. s.	5″ i. p. s.
Diameter of propeller shaft	2¾″	3″
Diameter of propeller	48″ 3-blade	55″ 3-blade
Length of shaft furnished	15 ft.	15 ft.
Starting device	Compressed air self starter	Compressed air self starter
Wire furnished — Primary	Necessary	Necessary
Wire furnished — Secondary	Necessary	Necessary
Size sea cock	2½″	2½″
Diameter of pipe for fuel connection	½″ i. p. s.	½″ i. p. s.
Lubrication	19-feed mech. lubricator & separate oil return pump	27-feed mech. lubricator & separate oil return pump
Water pump (plunger type)	2½″ intake	2½″ intake
Carburetor	3″	3″
Shaft coupling	Flange	Flange
Distance center of shaft down to top of foundation blocks	3⅝″	3⅝″
Distance between foundation bolts	28″	28″

For further engine measurements, see page 31

NOTE—Buffalo Heavy Duty engines are equipped with Hot-Spot Manifold not shown in the picture.



MEDIUM SPEED

	3-4 H. P.	5-6 H. P.
Cylinders	2	2
Bore	3"	3½"
Stroke	4"	5"
Piston displacement	56.55 cu. ins.	96.21 cu. ins.
Weight with reverse gear	240 lbs.	400 lbs.
Weight less reverse gear	190 lbs.	300 lbs.
Diameter of flywheel	14"	16"
Diameter of crankshaft	1 5/16"	1¼"
Height, center of crank up	16 3/16"	19 3/16"
Distance, center of crank down	4 3/16"	4½"
Width of space between foundation blocks	8¼"	9"
Width of base over all	11½"	12¼"
Length of motor over all	34 3/16"	46½"
Length of foundation of reverse gear motor	25"	28¼"
Length of foundation of single motor	9 3/16"	9¾"
Width over all — Port side	5½"	6¾"
Width over all — Starboard side	9½"	11½"
Speed — Normal	700 r. p. m.	600 r. p. m.
Speed — Minimum	200 r. p. m.	150 r. p. m.
Diameter of exhaust pipe	1"	1¼"
Diameter of propeller shaft	¾"	1"
Diameter of propeller	14" 2-blade / 12" 3-blade	16" 2-blade / 14" 3-blade
Length of shaft furnished	8 ft.	10 ft.
Starting device	Crank	Crank
Wire furnished — Primary	Necessary	Necessary
Wire furnished — Secondary	Necessary	Necessary
Size sea cock	3/8"	½"
Diameter of pipe for fuel connection	⅛" i. p. s.	⅛" i. p. s.
Lubrication	5-feed multiple oiler	7-feed multiple oiler
Water pump (plunger type)	¾" intake	½" intake
Carburetor	¾"	1"
Shaft coupling	Flange	Flange
Distance center of shaft down to top of foundation blocks	3/8"	7/16"
Distance between foundation bolts	10"	10⅞"

For further engine measurements, see page 33

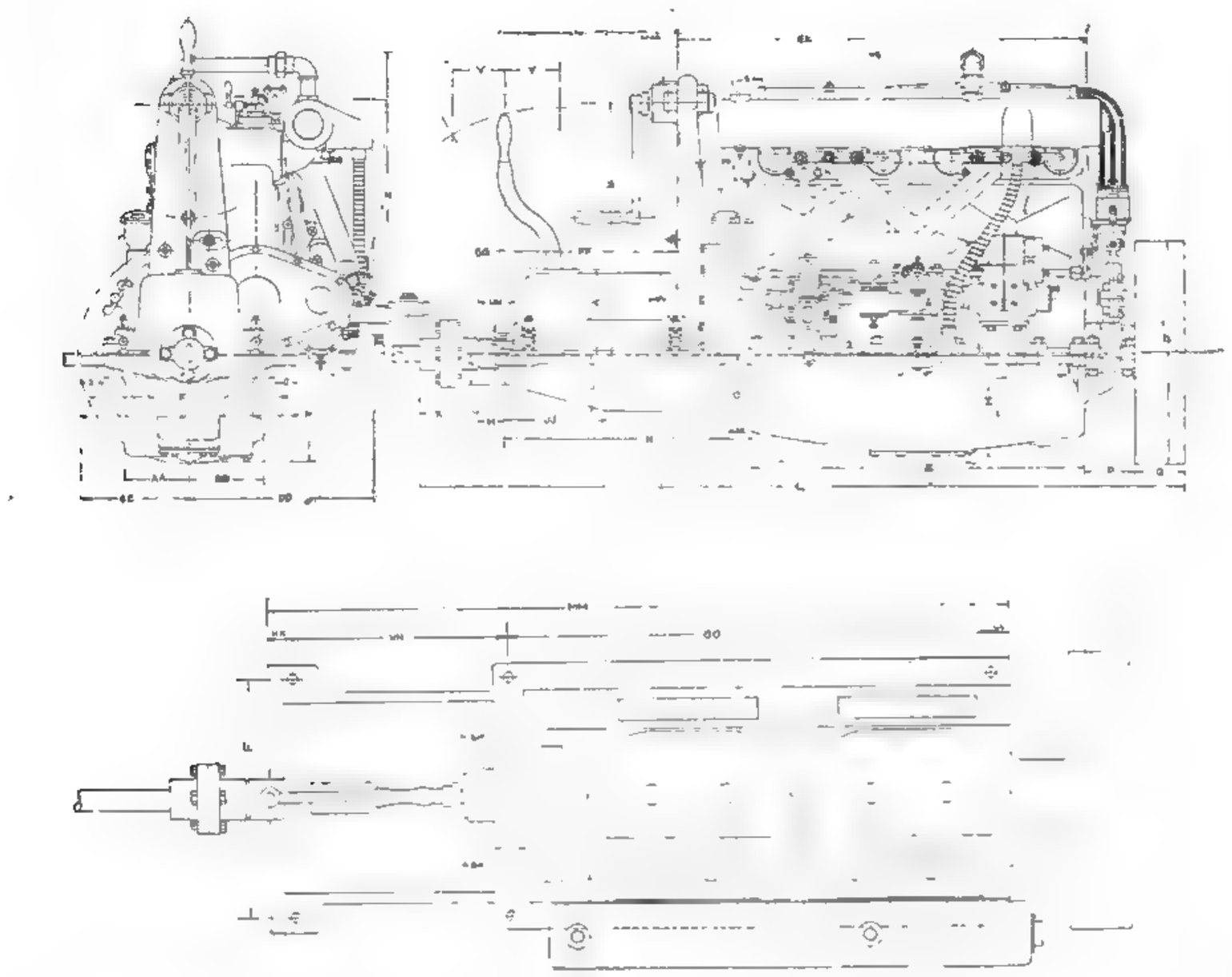
Two Cylinder Medium Speed Models

While the Builders of Buffalos confine their attention mostly to the building of engines of the larger sizes, two small Medium Speed models are offered for the convenience of owners who want even their small boats Buffalo powered. These engines have all the Buffalo qualities. They are similar except for a difference in bore and stroke as shown in the specifications.

The cylinders are of close grained gray iron cast en bloc, machined and tested like other Buffalo models. They are thoroughly water jacketed with large panels for cleaning. The base has a solid extension for the reverse gear. Pistons are of gray iron and balanced. Each piston has three ring grooves, the rings being above the hardened and ground piston pin which is held in place by a special lock ring which fits in a groove around the piston and passes around the end of the piston pin.

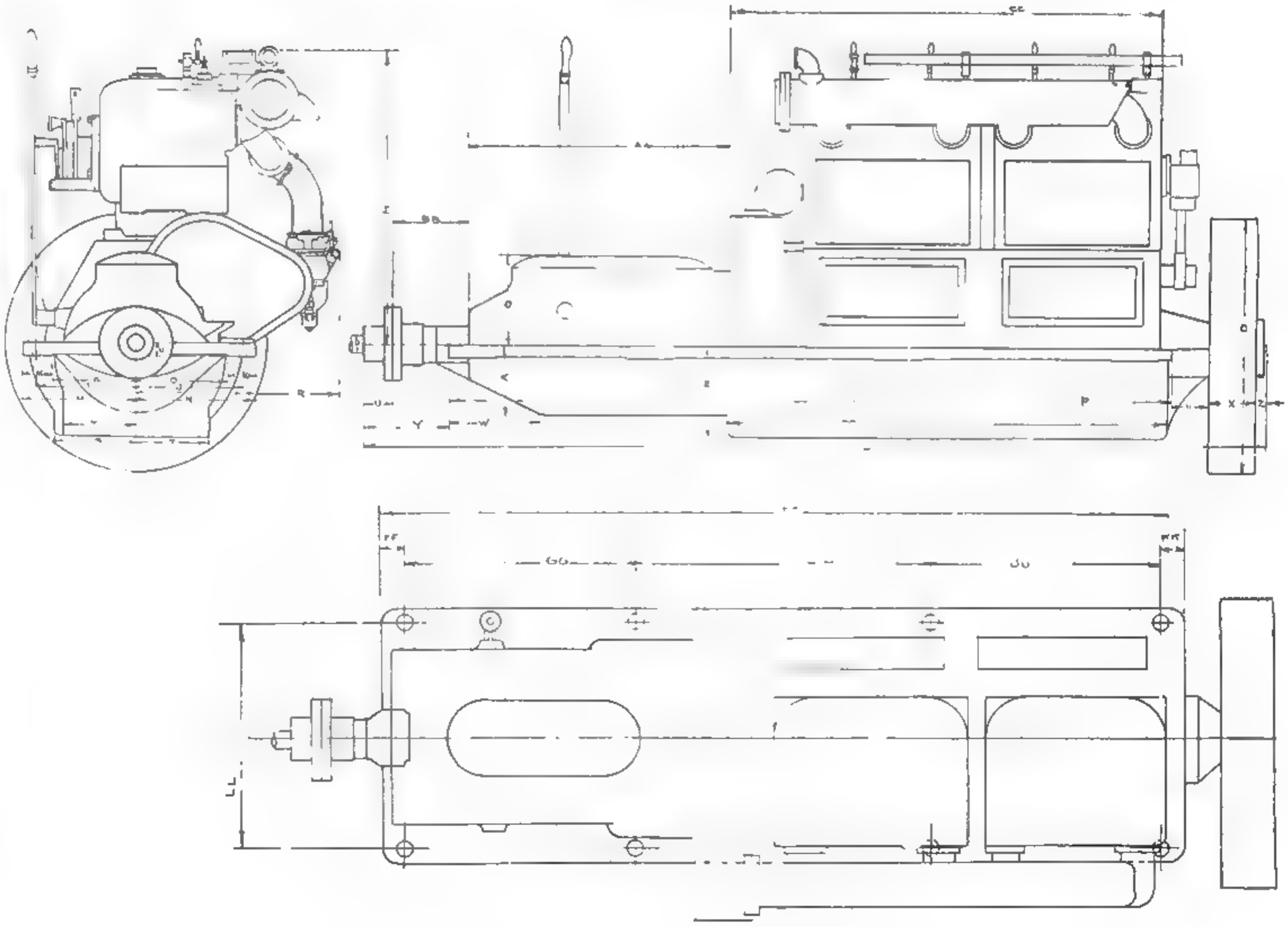
The connecting rods are drop forged from O. H. steel of H section, the lower connecting rod bearing being of bronze lined with babbitt, with bronze bushings at the upper end. The connecting rod bolts are of special alloy steel, heat treated. The crankshaft is of a special forged steel, a large margin of safety being allowed. The cams, made of forged steel, case-hardened and ground are a driving fit to the camshaft, and are held in place by a woodruff key and taper pins. Valves are of the poppet type with tapering seats, and are easily accessible by inspection plugs. Lubrication is by means of a gravity oiler and Buffalo ring oilers on the crankpins. Ignition is by means of a battery distributor system. The Buffalo reverse gear is of the planetary type with expanding wings. Flywheel is balanced by the running balance method.

Measurements 16-20 H. P. and 25-30 H. P. Cruiser and Runabout Type



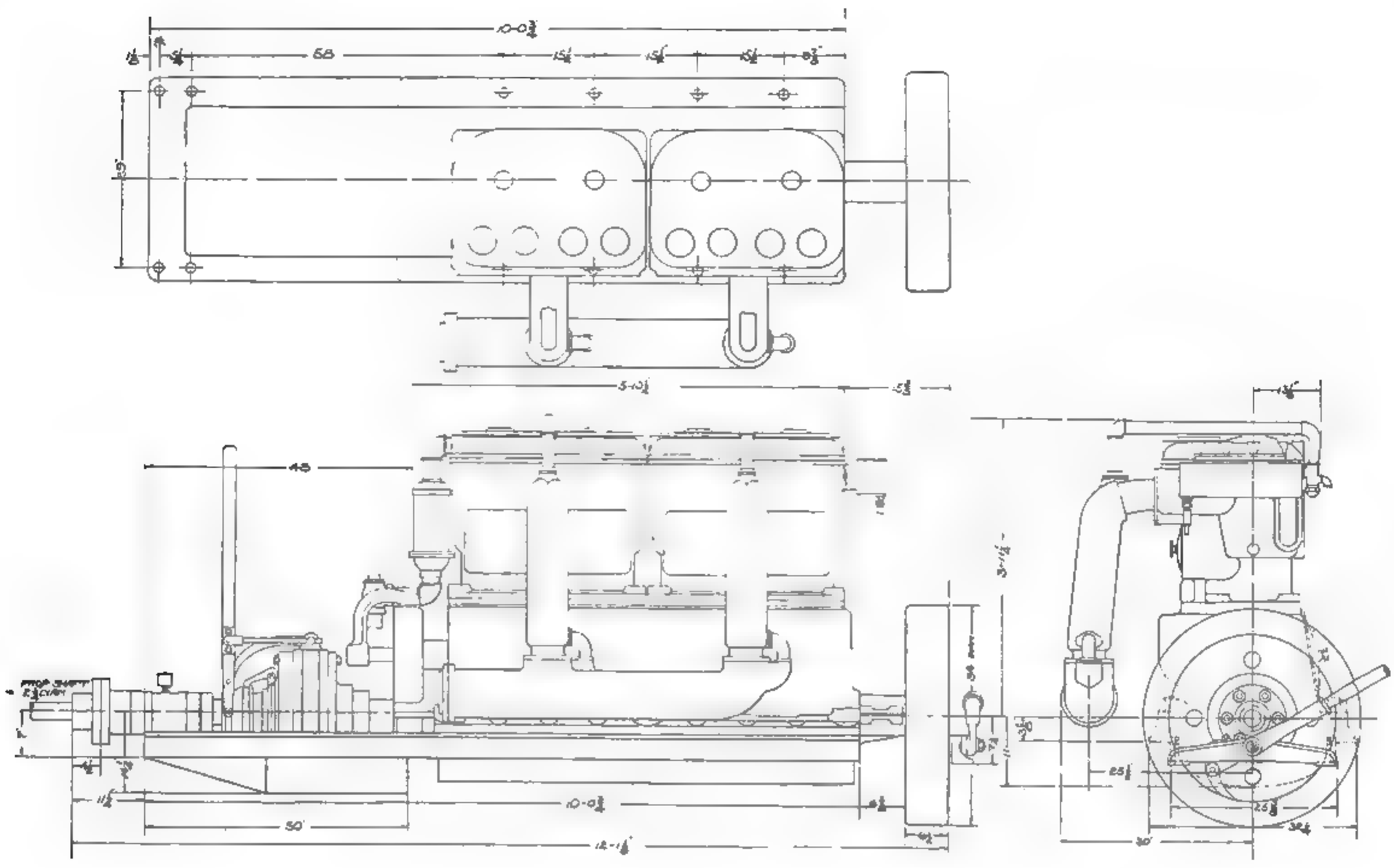
	16-20 H. P.	25-30 H. P.
A	5¼"	6⅞"
B	19⅞"	19⅞"
C	4⅝₃₂"	4½"
D	16"	17½"
E	27²⁵⁄₃₂"	26⅛"
F	14¾"	15⅝"
G	6"	6"
H	8⅛"	8⅛"
J	1"	1¼"
K	3¾"	3¾"
L	4' 7¼"	4' 11¹³⁄₁₆"
M	1⅞"	2⅛"
N	17³⁄₃₂"	19¹⁵⁄₁₆"
O	1½"	1¾"
P	1¾"	4"
Q	3"	3⅛"
R	¹⁵⁄₁₆"	1¹⁵⁄₁₆"
S	1½"	1¾"
T	13"	13"
V	4"	4"
W	16"	17"
X	22⅛"	23⅝"
Y	8⅛"	8⅛"
Z	2¼"	2⅜"
AA	4⅛"	4⅛"
BB	3½"	3½"
CC	8"	8½"
DD	12"	14½"
EE	30¼"	33¼"
FF	13¼"	13"
GG	¾"	¼"
HH	2¼"	2¾"
JJ	8⅝"	5³⁄₁₆"
KK	1⅞"	2¹⁵⁄₁₆"
LL	⅝"	¹³⁄₁₆"
MM	49³⁄₁₆"	51²³⁄₁₆"
NN	15⁵⁄₁₆"	13¹⁵⁄₁₆"
OO	28"	30¹³⁄₁₆"

Measurements 40-60 H. P. and 50-80 H. P. Cruiser and Runabout Type

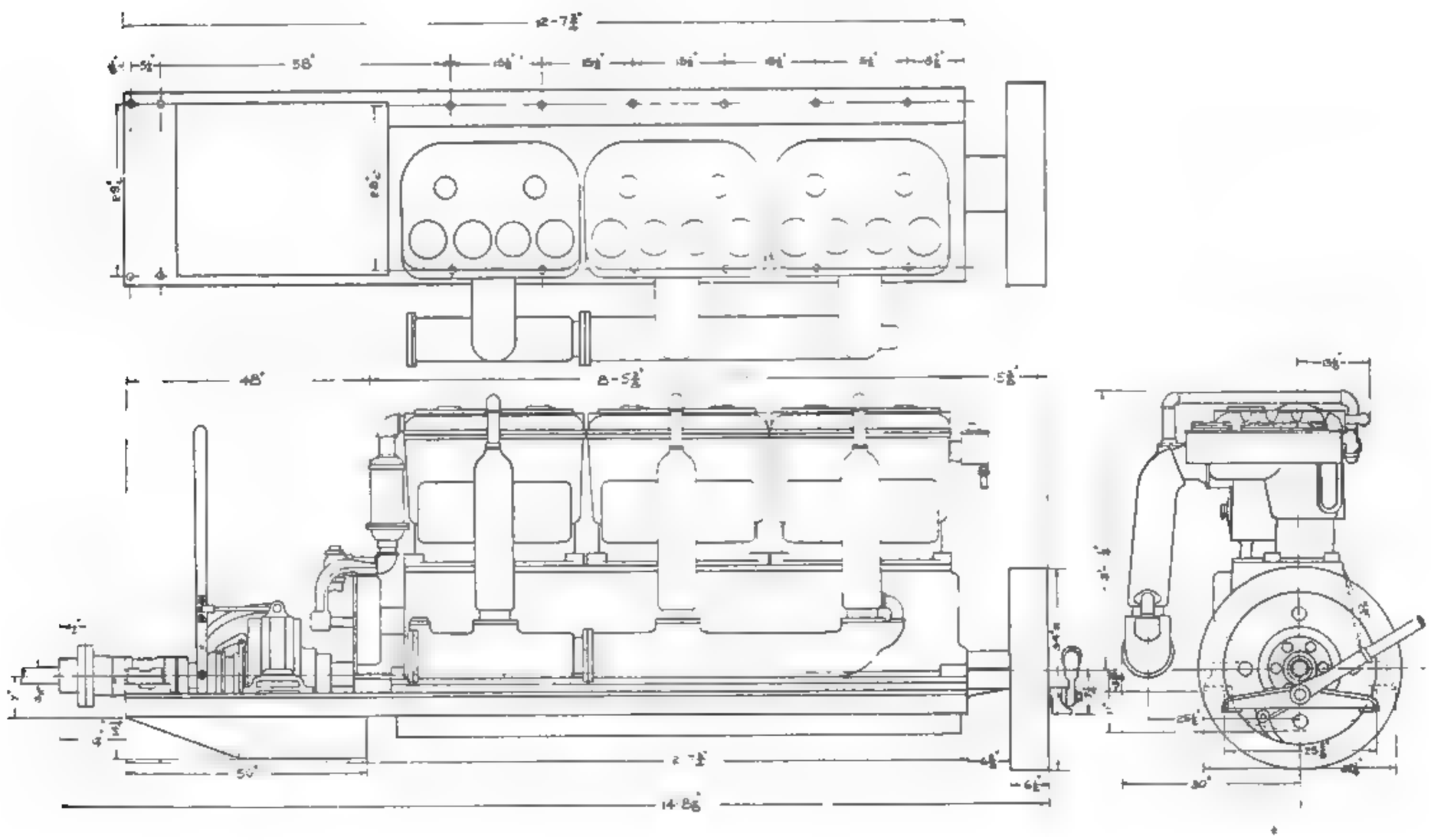


	40-60 H. P	50-80 H. P
A	5¹³⁄₁₆"	7"
B	8¼"	9¾"
C	1⅛"	1½"
D	20-22	26 or 28
E	2½" pipe	3" pipe
F	61⅜"	72⅝"
G	7³⁄₁₆"	9⅛"
H	25"	30¾"
I	8⁹⁄₁₆"	10½"
J	9⁵⁄₁₆"	10½"
K	2¹⁄₁₆"	2⅝"
L	76¹¹⁄₁₆"	90"
M	9½"	11¾"
N	10¹⁵⁄₁₆"	11¾"
O	7³³⁄₁₆"	8⅜"
P	1½" or 1¼"	1¾" or 2"
Q	7¾"	9⅛"
R	20¾"	23"₁₆"
S	6⅞"	7⅛"
T	6⁵⁄₁₆"	6½"
U	2½"	3"
V	3¹³⁄₁₆"	3¾"
W	10¾"	13⅜"
X	4"	4½"
Y	7⅛"	8⁷⁄₁₆"
Z	1⅛"	¹⁵⁄₁₆"
AA	22"	23⅛"
BB	6⁵⁄₁₆"	7¹¹⁄₁₆"
CC	36½"	43¹⁵⁄₁₆"
DD	37⅝"	44¼"
EE	61⅜"	72⅝"
FF	2"	2⅜"
GG	15"	16"
HH	21"	24"
JJ	20¼"	24½"
KK	3⅛"	3¾"
LL	17⅜"	21"

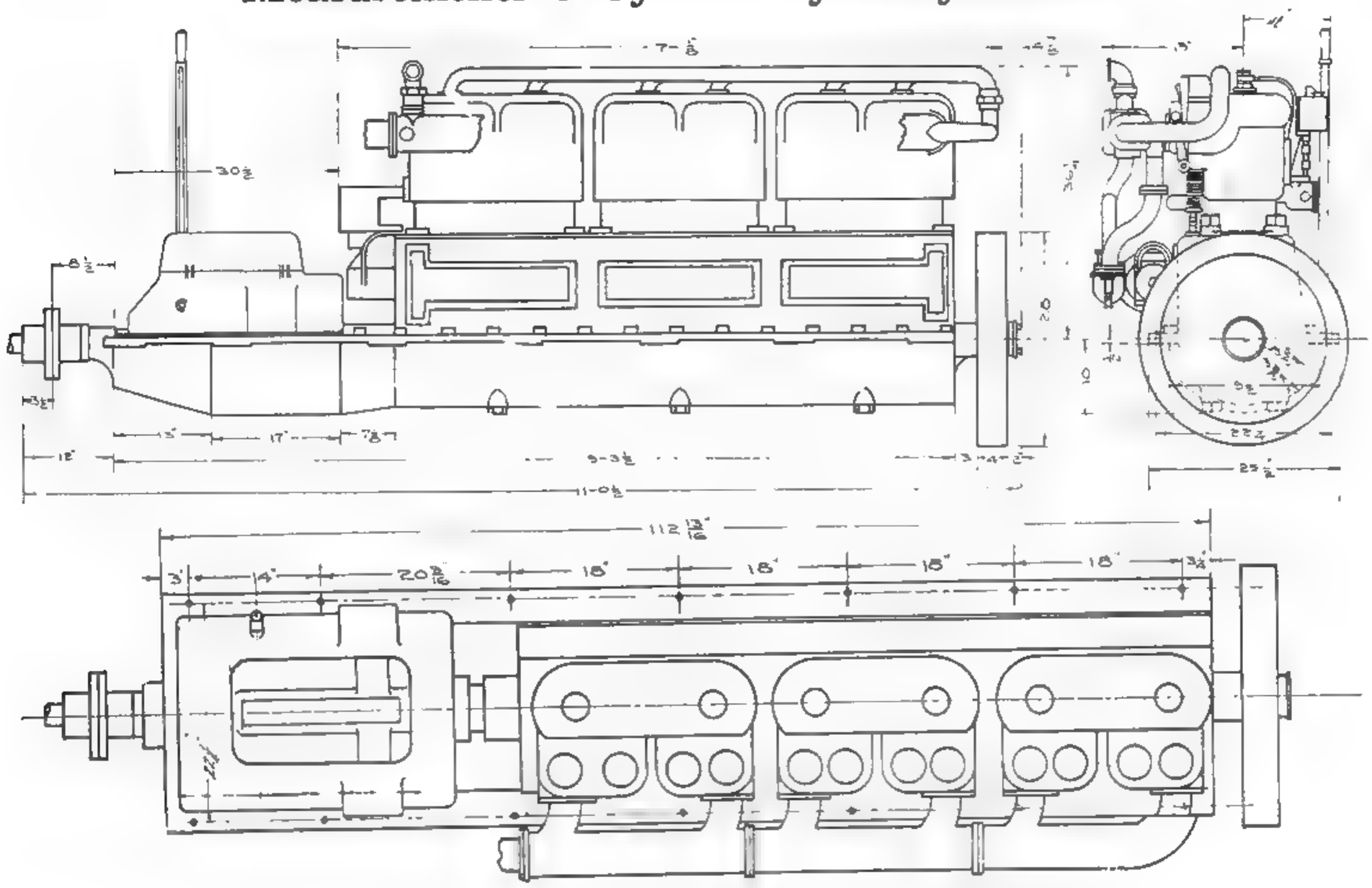
Measurements of 4 Cyl. 10 in. x 12 in. Heavy Duty Models



Measurements of 6 Cyl. 10 in. x 12 in. Heavy Duty Models



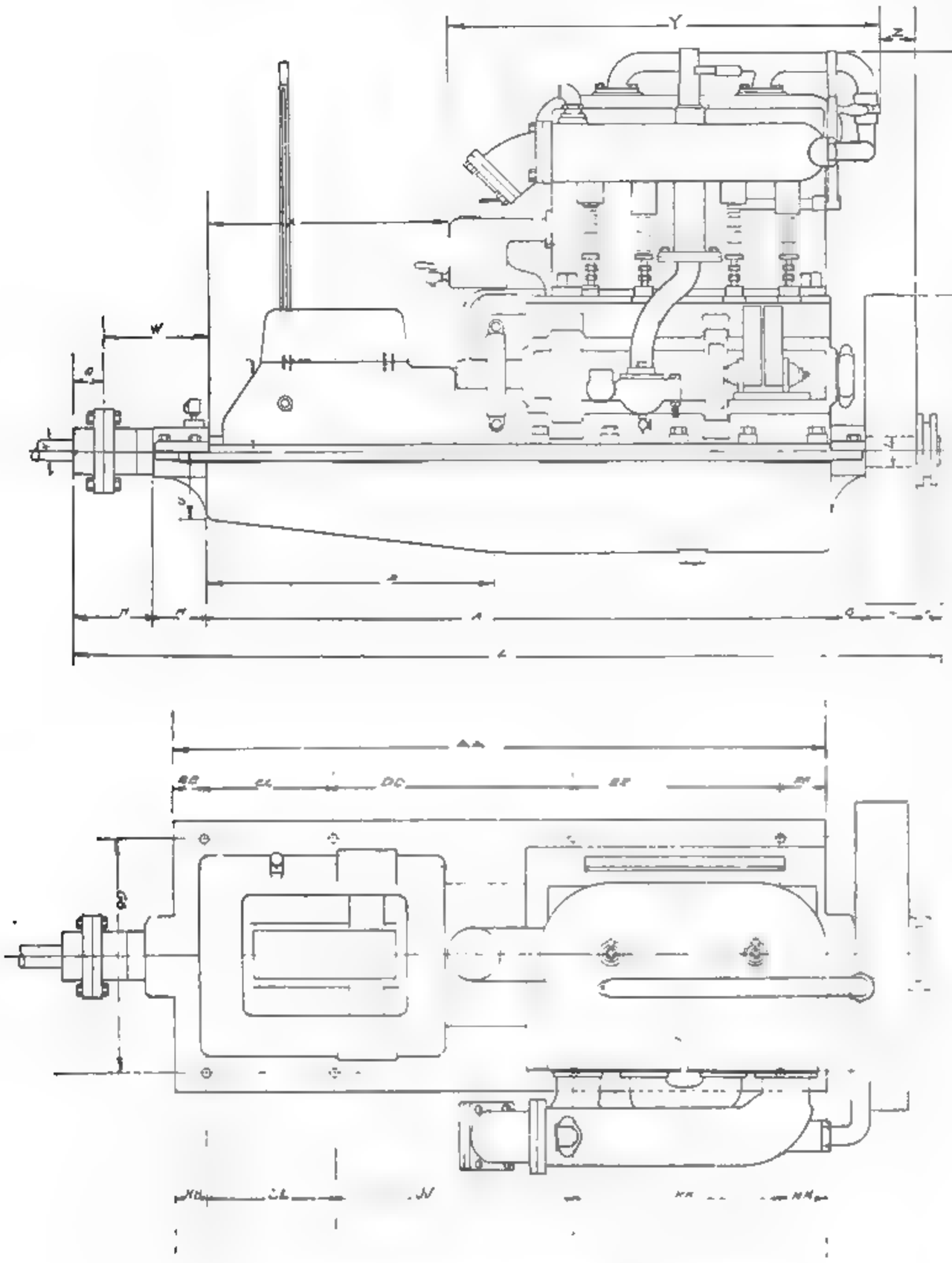
Measurements 6 Cyl. Heavy Duty Models

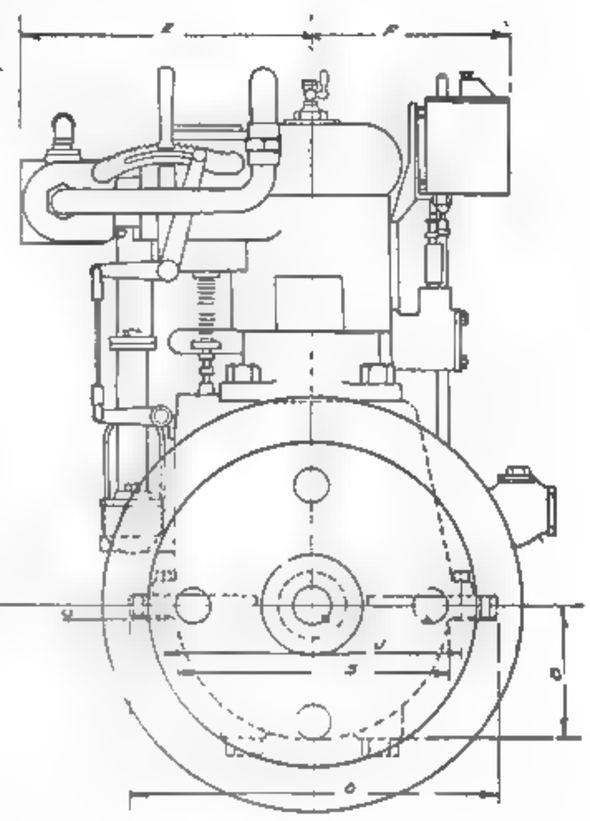


Measurements 4 Cyl. Heavy Duty Models

	20-24 H.P	26-30 H.P.	40-45 H.P
A	6 3/16"	7 1/8"	8 5/8"
B	14 3/8"	14 3/4"	17 3/4"
C	17"	17 1/2"	20 1/4"
D	20"	24"	28"
E	15"	20"	22"
F	19 11/16"	20 1/4"	23 1/2"
G	6 7/8"		
H	24"	27"	32 3/8"
I	28 1/2"	2' 10"	2' 11"
J	3 1/2"	6"	6"
K	10 7/16"	8 7/8"	9 5/16"
L	7' 1 3/4"	7' 7 15/16"	8' 5 15/16"
M	5 1/2"	13"	14"
N	2 1/4"	2 1/2"	3"
O	4 1/2"	4 1/4"	4"
P	1' 4"	1' 11/32"	2 1/8"
Q	16 1/4"		
R	3 1/2"		
S	5' 6 1/2"	6' 2"	6' 11 3/8"
T	1 1/4"	2"	2 1/4"
U	11"	13"	13 1/2"
V	14 1/2"	16 3/8"	19"
W	4' 1 1/2"	4' 5"	5' 0"
X	2 1/16"	2 5/16"	3"
Y	1 1/2"	1/2"	1/2"
Z	6 5/8"	8 3/8"	10"
AA	5' 9 1/2"	6' 2"	6' 11 3/8"
BB	2 1/2"	2"	3"
CC	23 5/8"	15 1/2"	16"
DD	20 1/4"	11"	18"
EE	13 3/8"	11"	18"
FF	9 5/8"	3"	3 1/4"
GG	17"	17 1/2"	20 1/4"
HH		18"	25 1/8"
JJ	2 1/2"	5 5/16"	6 5/16"
KK	24"	23 1/4"	26 7/8"
LL	4"	3 1/2"	3 1/2"
MM		13 1/2"	

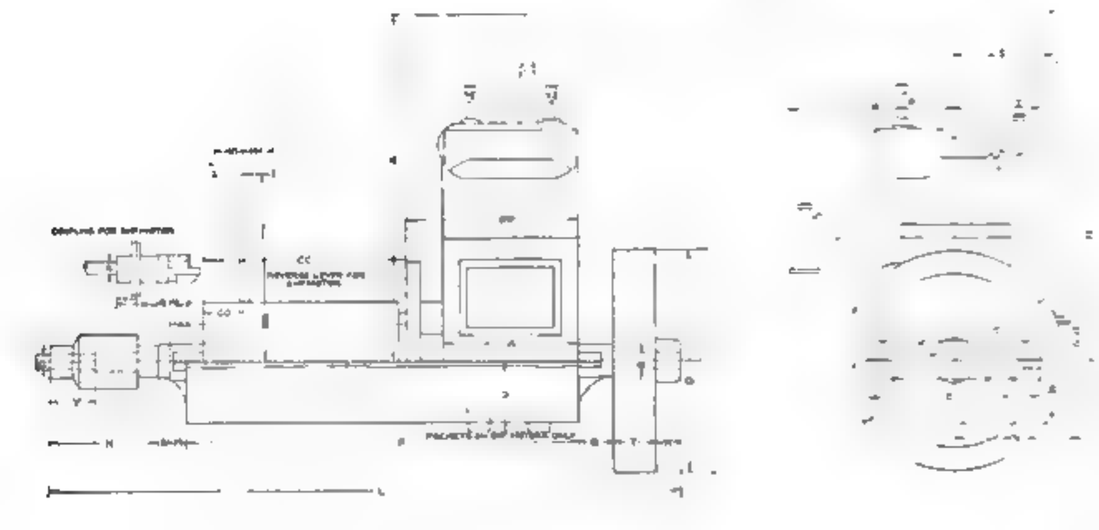
Measurements 2 Cyl. Heavy Duty Models

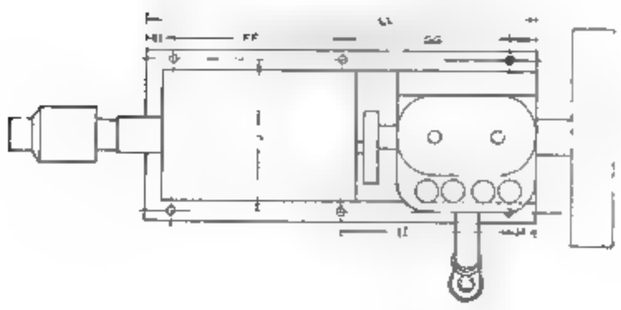




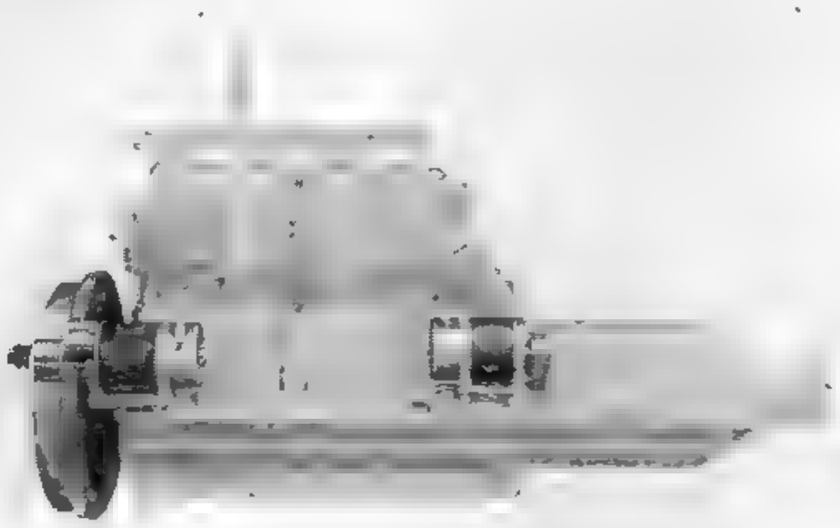
	10-12 H. P.	13-15 H. P.	20-22 H. P.
A	43 1/16"	46"	4' 5 5/16"
B	6 1/16"	7 1/2"	8 9/16"
C	13/16"	1/2"	1/2"
D	20"	23"	26"
■	14 9/16"	15 13/16"	18 3/4"
F	8 13/16"	10 5/8"	11 1/4"
G	2 5/8"	2 1/2"	3"
H	1 1/2"	1 1/2"	1 3/4"
I	2"	2 1/4"	2 1/2"
J	14 1/2"	16 1/4"	21 5/8"
K	1 1/16"	1 3/4"	1 3/4"
L	4' 11 11/16"	5' 4 7/8"	6' 1 3/4"
M	3 3/16"	4 5/8"	4 11/16"
N	6"	6"	7 1/8"
O	17 1/2"	20 1/4"	23 1/2"
P	25 5/16"	30 1/8"	35 7/16"
Q	2 1/2"	2 1/2"	3"
R	7"	21"	27 7/16"
S	12 3/4"	15"	17 1/8"
T	3 1/2"	3 1/4"	4"
U	6 1/16"	5 3/4"	6 11/16"
V	6 1/16"	6 15/16"	6 3/4"
W	7"	8 1/4"	8 5/8"
X	15 1/4"	18 3/16"	21"
Y	27 5/16"	31"	35 3/4"
Z	3 5/8"	2 5/16"	3 1/2"
AA	45"	48 3/8"	55 7/8"
BB	2"	2 1/4"	1 5/16"
CC		9 5/8"	24 1/4"
DD	16 1/2"	17 3/4"	13 15/16"
EE	17 1/2"	15 1/4"	13 1/2"
FF	9"	3 1/2"	3 1/4"
GG	15 1/4"	17 1/2"	21 5/8"
HH	2"	2 1/4"	1 5/16"
JJ	15"	18 3/4"	13 15/16"
KK	9"	14 1/4"	13 1/2"
LL	16 1/2"	9 5/8"	24 1/4"
MM	2 1/2"	3 1/2"	3 1/4"

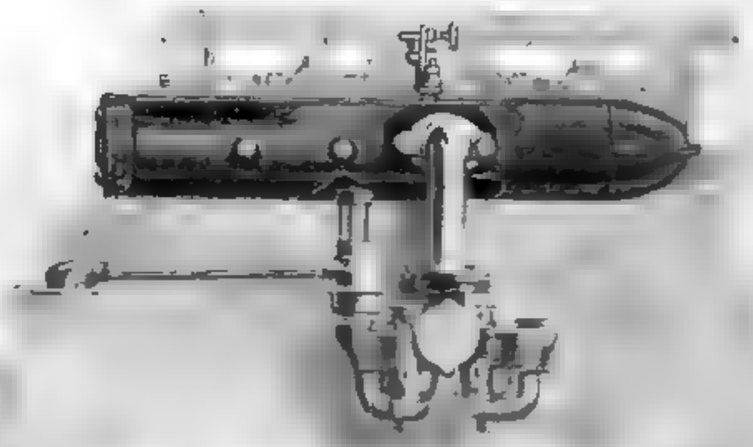
2 Cyl. Medium Speed Models

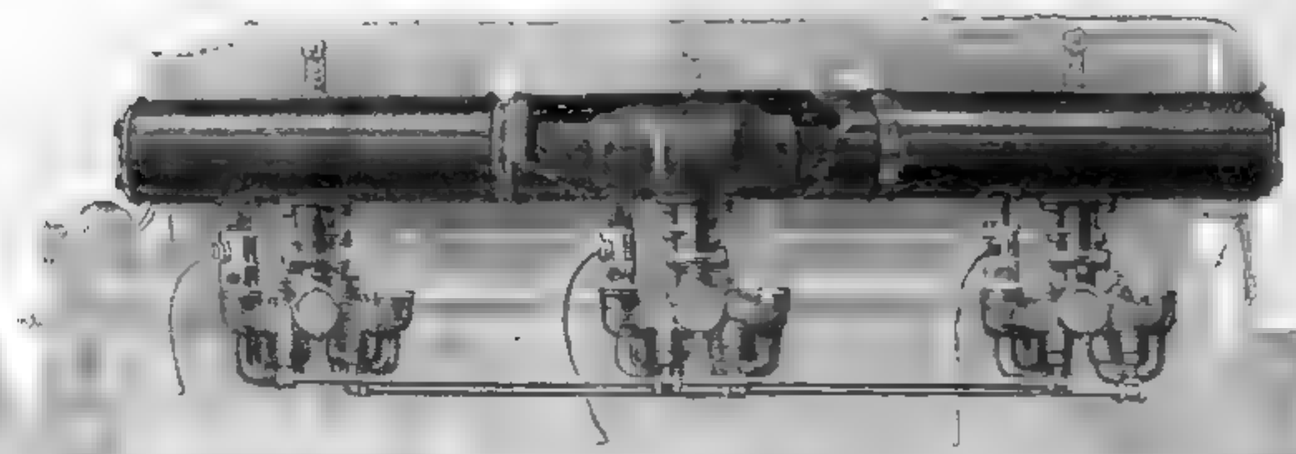




	3-4 H P	5 6 H P.		3-4 H P.	5-6 H. P.		3-4 H P.	5-6 H. P.
A	9 [illegible]"	9 [illegible]"	N	3"	7 7/8"	BB	15 1/2"	
B	4 [illegible]"	4 [illegible]"	O	11 1/2"	12 1/4"	CC	12"	14 7/8"
C	[illegible]"	[illegible]"	P	3/4"	1"	DD	12 3/4"	12 3/4"
D	14"	16"	Q	3/4"	7/8"	EE	2"	2"
E	1 [illegible]"	1 1/4"	R	10 1/4"	12"	FF	10 7/8"	12 3/8"
F	25"	28 1/4"	S		7"	GG	11"	12 7/8"
G	1 [illegible]"	2 1/2"	T	2 1/4"	3"	HH	1 3/8"	1 1/4"
H	17 [illegible]"	19 7/8"	U	5 3/8"		II		12 3/8"
I	6"	6"	V	1 1/2"		JJ		2"
J	10"	10 [illegible]"	W	8 1/2"	9"	KK	7 3/4"	
K	1 [illegible]"	1 [illegible]"	Y		2 3/4"	LL	25"	28 1/4"
L	34 [illegible]"	46 1/4"	Z		26"	MM	1 1/2"	
M	5/8"	1 3/8"	AA	1 1/4"	2"	OO	4 1/2"	







Kerosene Device

THE Buffalo kerosene vaporizer is not an experiment but a proven device by means of which engines of all sizes above 10 H. P. are successfully operating on kerosene. It consists of a combined intake and exhaust manifold. The in-going gas is passed through a chamber cast integral with and surrounding the exhaust manifold, and is heated by the exhaust gases. There is a dual carburetor, one side of which is adjusted to operate on gasolene and the other side on kerosene. The engine is started and operated on gasolene until the manifold is sufficiently heated to thoroughly vaporize kerosene, then the throw-over valve controlling the change of fuel is turned to the kerosene side, throwing the kerosene carburetor into operation and at the same time closing off the gasolene carburetor. Fresh water is admitted to the kerosene vaporizer by a special drop valve. The water is turned instantly into steam and prevents formation of carbon in the cylinder and retards combustion, thereby allowing gases to expand during full length of the power stroke.

Electric Starter

ALL Buffalo models can be equipped with a two unit electric starting and lighting system, with the exception of the 3-4 H. P. and the 5-6 H. P. By "two unit system" it is meant that there is an electric starting motor for cranking the engine and a separate generator for charging the storage battery.

Equipment

EQUIPMENT "A"—Consists of engine only (without reverse gear and with short base), magneto (except two-cylinder Medium-Speed engines which have only battery ignition) including spark coil, switch and muffler (if desired), set of tools, oiling system, as described elsewhere—starting device, carburetor attached and with warm-air device fitted, water pump attached (all engines of 10 h. p. and over, excepting the two smaller sizes of the Cruiser and Runabout Type are also fitted with air pumps, and with separate bilge pumps), ignition wire, one gallon of oil, and instruction book.

EQUIPMENT "C"—Consists of engine, reverse gear, clutch, levers and fittings, mounted in extension engine base with housing, coupling, steel propeller shaft, bronze stuffing box and stern bearing, solid bronze propeller, set of tools, magneto (except on two cylinder, Medium-Speed engines which have battery ignition only), spark coil, switch, muffler (if desired), oiling system, as described elsewhere—ball thrust and bearing mounted on after end of engine base, water pump attached (all engines of 10 h. p. and over, excepting the two smaller sizes of the Cruiser and Runabout Type, are also fitted with air pumps, and with separate bilge pumps), starting device, wire, lag screws, sea cock, water scoop, carburetor attached, and with warm-air device fitted, one gallon of oil, and instruction book.

IGNITION—Prices cover high tension ignition on all engines—double system being furnished on all engines 10 h. p. and over, as previously explained. If low tension or make-and-break ignition is preferred, it will be furnished on any engines of the Medium-Speed or Heavy-Duty types, but not on the Cruiser and Runabout models.

KEROSENE—We cannot furnish our kerosene device for the 3-4 h. p. All other sizes can be so equipped at net prices as quoted.

AIR STARTING DEVICE—This device we apply only to four- and six-cylinder engines of the Heavy-Duty type. The price list covers everything necessary except the pressure tank, which, because of the various shapes and sizes needed to suit individual requirements, it is impossible to make standard equipment. Gauge and safety valve are included.

ELECTRIC STARTERS—Electric starters can be supplied on all models if desired, at the prices quoted in price list.

All prices, including extras, are *strictly net* as quoted. The extra prices for special equipment apply only when such equipment is ordered with engine and *not for separate purchase*. A price list covering such material when sold separately will be sent on application.

Shipping Weights and Measurements

These weights and measurements apply to engines boxed for export shipment. The gross weights for domestic shipment will be found to be considerably less.

3-4 H. P. MEDIUM SPEED WITH EQUIPMENT "A"—Shipment consists of one box containing motor and outfit. Gross weight, 340 pounds; net weight, 224 pounds. Measurements, 34x32x23 inches.

3-4 H. P. MEDIUM SPEED WITH EQUIPMENT "C"—Shipment consists of one box containing motor and outfit. Gross weight, 470 pounds; net weight, 300 pounds. Measurements, 38x32x23 inches. One box containing shaft. Gross weight, 31 pounds; net weight, 12 pounds. Measurements, 106x4x3 inches.

5-6 H. P. MEDIUM SPEED WITH EQUIPMENT "A"—Shipment consists of one box containing motor and outfit. Gross weight, 375 pounds; net weight, 250 pounds. Measurements, 36x34x26 inches.

5-6 H. P. MEDIUM SPEED WITH EQUIPMENT "C"—Shipment consists of one box containing motor and outfit. Gross weight, 680 pounds; net weight, 460 pounds. Measurements, 42x36x26 inches. One box containing shaft. Gross weight, 50 pounds; net weight, 30 pounds. Measurements, 130x4x3 inches.

16-20 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Aluminum Base). Gross weight, 780 pounds; net weight, 510 pounds Measurements, 48x38x28 inches.

16-20 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Aluminum Base). Shipment consists of one box containing motor and outfit. Gross weight, 930 pounds, net weight, 660 pounds. Measurements, 59x38x28 inches. One box containing shaft. Gross weight, 50 pounds; net weight, 30 pounds. Measurements, 130x3x4 inches.

16-20 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Iron Base). Shipment consists of one box containing motor and outfit. Gross weight, 1000 pounds; net weight, 776 pounds. Measurements, 48x38x28 inches.

16-20 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Iron Base). Shipment consists of one box containing motor and outfit. Gross weight, 1150 pounds; net weight, 810 pounds. Measurements, 59x38x28 inches. One box containing shaft. Gross weight, 50 pounds; net weight, 30 pounds. Measurements, 130x3x4 inches.

25-30 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Aluminum Base). Shipment consists of one box containing motor and outfit. Gross weight, 1069 pounds; net weight, 550 pounds. Measurements, 54x40x32 inches.

25-30 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Aluminum Base). Shipment consists of one box containing motor and outfit. Gross weight, 1300 pounds; net weight, 870 pounds. Measurements, 62x32x40 inches. One box containing shaft. Gross weight, 60 pounds; net weight, 46 pounds. Measurements, 130x3x4 inches.

25-30 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Iron Base). Shipment consists of one box containing motor and outfit. Gross weight, 1110 pounds; net weight 833 pounds. Measurements 54x40x32 inches.

25-30 H.P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Iron Base). Shipment consists of one box containing motor and equipment. Gross weight, 1480 pounds; net weight, 1044 pounds. Measurements same as with aluminum base. One box containing shaft. Weights and measurements same as with aluminum base.

40-60 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Iron Base). Shipment consists of one box containing motor and outfit. Gross weight, 2050 pounds; net weight, 1520 pounds. Measurements, 73x44x38 inches.

40-60 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Iron Base). Shipment consists of one box containing motor and equipment. Gross weight, 2440 pounds; net weight, 1835 pounds. Measurements, 80x44x38 inches. One box containing shaft. Gross weight, 90 pounds; net weight, 64 pounds. Measurements, 130x4x4 inches.

40-60 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Aluminum Base). Shipment consists of one box containing motor and equipment. Gross weight, 1735 pounds; net weight, 1205 pounds. Measurements, 73x44x38 inches

40-60 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Aluminum Base). Shipment consists of one box containing motor and equipment. Gross weight, 1920 pounds; net weight, 1630 pounds. Measurements, 80x44x38 inches. One box containing shaft. Gross weight, 90 pounds; net weight, 64 pounds. Measurements, 130x4x4 inches.

50-80 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Iron Base). Shipment consists of one box containing motor and equipment. Gross weight, 3250 pounds; net weight, 2440 pounds.

50-80 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Iron Base). Shipment consists of one box containing motor and equipment. Gross weight, 3510 pounds; net weight, 2900 pounds. Measurements, 94x50x44 inches. One box containing shaft. Gross weight, 165 pounds; net weight, 123 pounds. Measurements, 130x4x5 inches.

(Continued from page 37)

Shipping Weights and Measurements

These weights and measurements apply to engines boxed for export shipment. The gross weights for domestic shipment will be found to be considerably less.

50-80 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "A"—(Aluminum Base). Shipment consists of one box containing motor and equipment. Gross weight, 2758 pounds; net weight, 2018 pounds.

50-80 H. P. CRUISER AND RUNABOUT ENGINE WITH EQUIPMENT "C"—(Aluminum Base). Shipment consists of one box containing motor and equipment. Gross weight, 3130 pounds; net weight, 2150 pounds. Measurements, 94x50x44 inches. One box containing shaft. Gross weight, 165 pounds; net weight, 123 pounds. Measurements, 130x4x5 inches.

10-12 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and outfit. Gross weight, 1475 pounds; net weight, 950 pounds. Measurements, 48x42x32 inches.

10-12 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and outfit. Gross weight, 1600 pounds; net weight, 1250 pounds. Measurements, 64x42x32 inches. One box containing shaft. Gross weight, 85 pounds; net weight, 66 pounds. Measurements, 130x4x4 inches.

13-15 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and outfit. Gross weight, 1375 pounds; net weight, 1100 pounds. Measurements, 48x46x32 inches.

13-15 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and outfit. Gross weight, 2200 pounds; net weight, 1730 pounds. Measurements, 67x46x32 inches. One box containing shaft. Gross weight, 100 pounds; net weight, 75 pounds. Measurements, 130x4x4 inches.

20-22 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and equipment. Gross weight, 2050 pounds; net weight, 1640 pounds. Measurements, 50x52x38 inches.

20-22 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 3000 pounds; net weight, 2200 pounds. Measurements, 77x52x38 inches. One box containing shaft. Gross weight, 118 pounds; net weight, 92 pounds. Measurements, 130x4x4 inches.

20-24 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and equipment. Gross weight, 2290 pounds; net weight, 1690 pounds. Measurements, 68x42x32 inches.

20-24 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 2640 pounds; net weight, 2040 pounds. Measurements, 89x42x32 inches. One box containing shaft. Gross weight, 118 pounds; net weight, 92 pounds. Measurements, 130x4x4 inches.

26-30 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and equipment. Gross weight, 2900 pounds; net weight, 2200 pounds. Measurements, 72x42x34 inches.

26-30 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 3300 pounds; net weight, 2600 pounds. Measurements, 94x48x34 inches. One box containing shaft. Gross weight, 170 pounds; net weight, 140 pounds. Measurements, 130x5x4 inches.

40-45 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of box containing motor and equipment. Gross weight, 3920 pounds; net weight, 3200 pounds. Measurements, 76x60x40 inches.

40-45 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 4990 pounds; net weight, 3975 pounds. Measurements, 108x60x42 inches. One box containing shaft. Gross weight, 200 pounds; net weight, 175 pounds. Measurements, 130x5x4 inches.

60-70 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and equipment. Gross weight, 5952 pounds; net weight, 4675 pounds. Measurements, 99x60x42 inches.

60-70 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 7200 pounds; net weight, 5800 pounds. Measurements, 137x60x42 inches. One box containing shaft. Gross weight, 320 pounds; net weight, 271 pounds. Measurements, 130x5x5 inches.

85-100 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and equipment. Gross weight, 11320 pounds; net weight, 9820 pounds. Measurements, 108x74x52 inches.

85-100 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 12,750 pounds; net weight, 11,020 pounds. Measurements, 149x74x52 inches. One box containing shaft. Gross weight, 360 pounds; net weight, 320 pounds. Measurements, 5x5x190 inches.

125-150 H. P. HEAVY DUTY WITH EQUIPMENT "A"—Shipment consists of one box containing motor and equipment. Gross weight, 12,750 pounds; net weight, 11,000 pounds. Measurements, 144x73x52 inches.

125-150 H. P. HEAVY DUTY WITH EQUIPMENT "C"—Shipment consists of one box containing motor and equipment. Gross weight, 13,000 pounds; net weight, 11,250 pounds. Measurements, 174x73x52 inches. One box containing shaft. Gross weight, 492 pounds; net weight, 404 pounds. Measurements, 8x8x190 inches.

NOTE—While these shipping weights and dimensions are believed to be as accurate as it is possible to make them, attention is called to the fact that we do not vouch for their accuracy. They are given simply as a convenience in aiding buyers to roughly estimate carrying charges.

Code Words

The use of a private code in cabling will be found convenient and economical. For further telegraphic communication we request the use of Western Union Code, but any of the standard codes will be understood.

Cable Address, "Fischer"—Buffalo

Outfits

3- 4 h. p.	Equipment A	*Trice*
3- 4 h. p.	Equipment C	*Tring*
5- 6 h. p.	Equipment A	*Quinc*
5- 6 h. p.	Equipment C	*Quint*
16-20 h. p.	Equipment A	*Auxon*
16-20 h. p.	Equipment C	*Auxat*
25-30 h. p.	Equipment A	*Autma*
25-30 h. p.	Equipment C	*Avant*
40-60 h. p.	Equipment A	*Cruer*
40-60 h. p.	Equipment C	*Cruam*
50-80 h. p.	Equipment A	*Krugo*
50-80 h. p.	Equipment C	*Krima*
10-12 h. p.	Equipment A	*Smila*
10-12 h. p.	Equipment C	*Smahe*
13-15 h. p.	Equipment A	*Palis*
13- 15 h. p.	Equipment C	*Pence*
20- 22 h. p.	Equipment A	*Duxon*
20- 22 h. p.	Equipment C	*Duxat*
20- 24 h. p.	Equipment A	*Rever*
20- 24 h. p.	Equipment C	*Revil*
26- 30 h. p.	Equipment A	*Savag*
26- 30 h. p.	Equipment C	*Savoy*
40- 45 h. p.	Equipment A	*Tenan*
40- 45 h. p.	Equipment C	*Terga*
60- 70 h. p.	Equipment A	*Urhin*
60- 70 h. p.	Equipment C	*Urban*
85-100 h. p.	Equipment A	*Forla*
85-100 h. p.	Equipment C	*Foger*
125-150 h. p.	Equipment A	*Sixha*
125-150 h. p.	Equipment C	*Sixto*

Particulars

With make-and-break ignition	*Mabel*
With jump-spark ignition	*Jacks*
To have bronze shaft	*Barte*
To have sprocket and chain rear starting device	*Socer*
*Feet extra shaft required	*Baren*
With aluminum base	*Alum*
With iron base	*Iron*
With kerosene device	*Kero*
With electric starter	*Elexo*

Shipments

Within four days	*Fodey*
Within one week	*Uncle*
Within ten days	*Capin*
Within two weeks	*Sopor*
Within three weeks	*Serum*
Within one month	*Thora*
Within six weeks	*Toxin*
Within two months	*Torso*

Instructions Regarding Orders

Enter order for	*Entry*
Enter order for immediate shipment	*Rigol*
Enter order and hold for instructions	*Roter*
Ship to	*Septe*
Ship in care of	*Septo*
To be shipped not later than	*Sanix*
Ship by freight	*Terit*
Ship by express	*Terps*
Trace shipment	*Trade*
When can you fill our order of	*Wilet*
How soon can you ship	*Hexad*
When will you ship	*Herod*
When did you ship	*Humit*
Duplicate our order of	*Detro*
Add to order of	*Plant*
What will be the gross weight of	*Plura*
Wire price and delivery of	*Argol*
Mail full information regarding	*Comes*

Replies

Quotation for immediate acceptance	*Mogal*
We will ship	*Lumer*
Order received	*Larch*
Order was shipped as per your instructions	*Lamon*
Shall we ship	*Forna*
We have shipped	*Outgo*
We can ship immediately	*Focus*
Cannot promise definitely—are writing	*Dogma*
As soon as possible	*Benga*
Impossible to give information desired by wire—are writing	*Infar*
We can ship	*Cansh*

*A numeral inserted after the word will indicate extra length required.

Guarantee

EACH Buffalo engine is guaranteed for one year from date of shipment as shown by invoice, this guarantee being limited to replacement in our factory of the parts giving out under normal service because of defective material or workmanship and not due to carelessness or neglect on the part of the user. If because of the circumstances the repairs cannot be made at the company's factory this warranty is limited to the shipment without charge of the parts intended to replace those found to be defective.

All agreements are subject to delays caused by fires, strikes, accidents or other causes beyond our control and it is understood that while defective material will be replaced no claim for labor or damages will be allowed. Carburetors, magnetos, starters, generators, batteries and other trade accessories are warranted separately by their respective manufacturers. We reserve the right to change the design of our motors and equipment when deemed advisable, without incurring any obligations to install same on engines previously sold.

Terms

TWENTY-FIVE per cent of price of engine must accompany order, the balance to be paid when engine is ready for shipment or sight draft against bill of lading. We usually have engines in stock ready for shipment, and it is always best to send full amount with order, as this frequently prevents delay in shipping as well as facilitating delivery at destination.

All tests made at our plant are final. The buyer may have a representative present to confirm our tests, but we will not accept any tests made after engine has been shipped.

...FS-CO., BUFFALO.